



ALLEN-BRADLEY
A ROCKWELL INTERNATIONAL COMPANY

User's Manual

PLC-3 Programming Software

(Cat. No. 6201-PLC3, 6203-PLC3, 6211-PLC3, 6213-PLC3)

Important User Information

Any illustrations, charts, circuits, and examples shown in this document are intended solely to help you understand the text, not to guarantee operation. Because of the many variables and requirements associated with any particular installation, Allen-Bradley Company will not assume responsibility for actual use based upon illustrations of applications.

Because of the variety of possible applications for the equipment described in this document, you must satisfy yourself regarding its acceptability for each of your applications. Allen-Bradley Company will not be responsible or liable for indirect or consequential damages that may result from installation or use of this equipment.

For terms and conditions that apply to the sale of Allen-Bradley equipment and software described in this document, refer to publication 6500, Terms and Conditions of Sale.

Reproduction of any part of this manual without written permission of Allen-Bradley Company headquarters is prohibited.

Copyright 1989 Allen-Bradley Company, Inc.

If you find errors, discrepancies, or inadequacies in this document, please contact:

Allen-Bradley Company, Inc.
Industrial Computer and Communication Group
Commercial Services
747 Alpha Drive
Highland Heights, OH 44143

Table of Contents

Chapter 1	Using This Manual
Chapter 2	Getting Started with the Software
Chapter 3	Online & Offline Configuration
Chapter 4	Processor Functions and LIST
Chapter 5	Ladder Programming and Monitoring
Chapter 6	Ladder Editor
Chapter 7	Configuring the Ladder Display
Chapter 8	Changing Processor Mode
Chapter 9	Searching for Instructions, Addresses, and Rungs
Chapter 10	Forcing Functions
Chapter 11	Data Monitor
Chapter 12	General Utilities and Processor Status
Chapter 13	Data Highway and Report Generation Messages
Chapter 14	Save, Restore and Compare
Chapter 15	Program Documentation
Chapter 16	Generate and Print Reports
Chapter 17	Import/Export
Chapter 18	Delete Context
Chapter 19	Miscellaneous Features
Chapter 20	T45, 6122 and IBM XT Information
Chapter 21	Additional Information About the Software
Chapter 22	2.0 Editing Changes
Chapter 23	2.0 File Option Changes
Chapter 24	2.0 Report Generation Changes
Chapter 25	Smart Menu

Table of Contents *(Continued)*

Appendix A	PLC-3 Instructions
Appendix B	Error Messages
Appendix C	Cable Pinouts
Appendix D	Switch Settings and Cable Connections
Appendix E	LIST Function
Appendix F	Instruction Main Addresses
Appendix G	File Types and Extensions
Appendix H	Sample Reports

<u>Chapter</u>	<u>Description</u>	<u>Page</u>
1	Using This Manual	
	Manual Objectives.....	1-1
	Audience.....	1-1
	Warnings, Cautions, and Important Information.....	1-1
	Related Publications.....	1-2
	Conventions.....	1-2
	Terms and Definitions.....	1-2
2	Getting Started with the Software	
	Chapter Objectives.....	2-1
	Software Functions.....	2-1
	Hardware Requirements.....	2-1
	Running the Software.....	2-1
	Keys You Use.....	2-3
	Operator Prompts.....	2-4
	Online Programming/Documentation [F1].....	2-4
	Online Configuration [F2].....	2-5
	Offline Programming/Documentation [F3].....	2-5
	Offline Configuration [F4].....	2-5
	Using the WHO Utility [F5].....	2-6
	WHO Listen.....	2-8
	WHO Active.....	2-9
	Getting Station Diagnostics.....	2-11
	System Configuration [F6].....	2-13
	Selecting Colors.....	2-15
	Specifying Link Mode.....	2-17
	Specifying Printer Characteristics.....	2-18
	Defining Directory Paths.....	2-18
	File Options [F7].....	2-21
	Print/View Reports [F8].....	2-23
	Exiting From the Menu System [F10].....	2-23
	2nd Menus.....	2-23
3	Online & Offline Configuration	
	Chapter Objectives.....	3-1
	Online Configuration.....	3-1
	Configuring a 1784-KTK1.....	3-2
	Configuring a 1784-KTP.....	3-5
	Configuring a 1784-KL.....	3-6
	Configuring a 1784-KT.....	3-8
	Using a Serial Port.....	3-11
	Remote Programming.....	3-18
	Offline Configuration.....	3-19
	Selecting a Processor File.....	3-20
	Creating a Processor File.....	3-21

<u>Chapter</u>	<u>Description</u>	<u>Page</u>
4	Processor Functions and LIST	
	Chapter Objectives.....	4-1
	General Description.....	4-1
	Change Mode [F1].....	4-3
	Change Name [F4].....	4-3
	LIST [F5].....	4-4
	Create Context [F6].....	4-5
	Directory Display [F7].....	4-5
	Monitor Program [F8].....	4-5
5	Ladder Programming and Monitoring	
	Chapter Objectives.....	5-1
	Getting Started.....	5-1
6	Ladder Editor	
	Chapter Objectives.....	6-1
	Introduction to the Ladder Editor.....	6-1
	Ladder Editor Display.....	6-2
	Keys You Use in the Ladder Editor.....	6-3
	The First Step in Ladder Editing Function.....	6-5
	I/R/D Editing.....	6-7
	Editing Rungs.....	6-9
	Inserting and Instruction on a Rung.....	6-11
	Entering Additional Instructions.....	6-14
	Deleting Instructions.....	6-20
	Re-inserting Deleted Instructions.....	6-21
	Branch Editing.....	6-23
	Creating Multiple Branch Levels on a Rung.....	6-27
	Deleting Branches.....	6-32
	Re-inserting Deleted Branches.....	6-33
	Creating Nested Branches.....	6-34
	Accept Rung [F10].....	6-34
	Addressing.....	6-35
	Data Table Addressing.....	6-35
	Timer and Counter Bit Addressing.....	6-36
	File Addressing.....	6-36
	Extended Addressing.....	6-36
	Status Line Messages.....	6-39
7	Configuring the Ladder Display	
	Chapter Objectives.....	7-1
	Display Configuration.....	7-1
	Rung Displays.....	7-1
	Displaying Comments and Symbols.....	7-2

<u>Chapter</u>	<u>Description</u>	<u>Page</u>
8	Changing Processor Mode	
	Chapter Objectives.....	8-1
	How to Change Processor Modes.....	8-1
9	Searching for Instructions, Addresses and Rungs	
	Chapter Objectives.....	9-1
	Instruction, Rung and Address Searches.....	9-1
	Searching for Address.....	9-2
	Searching for Rung.....	9-2
10	Forcing Functions	
	Chapter Objectives.....	10-1
	Force Monitor.....	10-1
	Forcing I/O Bits.....	10-3
	Force Off and On.....	10-3
	Removing a Force.....	10-4
	Enabling and Disabling Forces.....	10-5
	Monitoring Inputs and Outputs.....	10-6
	Forcing Bits From the Force Monitor.....	10-7
	Removing Forces From the Force Monitor.....	10-7
11	Data Monitor	
	Chapter Objectives.....	11-1
	Displaying the Processor Data Table.....	11-1
	[F1] Change Radix.....	11-2
	[F5] Specify Address.....	11-3
	[F6] Force Monitor.....	11-3
	[F7] Next File, [F8] Previous File.....	11-3
	[F9] Next Page, [F10] Previous Page.....	11-3
	Entering and Changing Data.....	11-4
12	General Utilities and Processor Status	
	Chapter Objectives.....	12-1
	Processor Utility Menu.....	12-1
	Memory Map.....	12-2
	Data Table Map.....	12-3
	Deleting Data Tables.....	12-5
	Program Map.....	12-6
	Message Map.....	12-7
	System Symbols Map.....	12-8
	Converted Procedures Map.....	12-8
	Force Table Map.....	12-9

<u>Chapter</u>	<u>Description</u>	<u>Page</u>
12	General Utilities and Processor Status <i>(Continued)</i>	
	Processor Status.....	12-10
	Status Fields.....	12-11
	I/O Status.....	12-13
	Contact History.....	12-14
	Addresses You Can Monitor.....	12-14
	Bit Mask.....	12-14
	Writing to Disk.....	12-15
	Contact History Display.....	12-15
13	Data Highway and Report Generation Messages	
	Chapter Objectives.....	13-1
	Data Highway and Report Generation Messages.....	13-1
	Editing a Message.....	13-3
	Deleting a Message.....	13-6
	Copying a Message.....	13-7
	Selecting a File.....	13-8
14	Save, Restore and Compare	
	Chapter Objectives.....	14-1
	Terms Used in this Chapter	14-1
	File Names.....	14-2
	Cursor Keys.....	14-2
	Save/Restore.....	14-3
	Save.....	14-4
	Save to Tape [F1], Save to File [F2].....	14-4
	Save Physical [F1].....	14-5
	Save Logical [F2].....	14-7
	Save Context.....	14-13
	Restore.....	14-14
	Restore from Tape [F3], Restore from File [F4].....	14-14
	Compare.....	14-16
	Compare to Tape [F5], Compare to File [F6].....	14-17
15	Program Documentation	
	Chapter Objectives.....	15-1
	Rules and Conventions.....	15-1
	Buffers.....	15-3
	Symbols.....	15-4
	Using the Database Editor.....	15-4
	Choosing the Database Mode.....	15-7
	Searching the Database.....	15-8
	Displaying Cross References.....	15-10
	Main Addresses.....	15-11

<u>Chapter</u>	<u>Description</u>	<u>Page</u>
16	Generate and Print Reports	
	Chapter Objectives.....	16-1
	Available Reports.....	16-1
	Reports Display.....	16-1
	Report Options.....	16-3
	Program Listing.....	16-3
	Cross Reference.....	16-5
	Memory Map.....	16-6
	Processor Status.....	16-6
	I/O Status.....	16-6
	Data Table.....	16-6
	Force Status.....	16-7
	Symbol Table.....	16-8
	Unused Addresses.....	16-9
	Memory Usage.....	16-9
	Report Generation Procedures.....	16-10
	Data Highway Procedures.....	16-10
	General Options.....	16-11
	Generating the Report.....	16-12
	Print Reports.....	16-13
	Configuring the Printer.....	16-15
	Parallel.....	16-16
	Serial.....	16-16
17	Import/Export	
	Import/Export Description.....	17-1
	How to Access Import/Export.....	17-1
	How to Access ABA5RCIM.....	17-2
	Features.....	17-2
	How Import/Export Works.....	17-2
	Definitions.....	17-3
	How to Use the Import Utility.....	17-3
	Syntax Errors.....	17-5
	Collisions.....	17-5
	.LOG File.....	17-6
	How to Use the Export Utility.....	17-6
	How to Use the Area Five Rung Comment Import Utility.....	17-9
	How to Configure Communications.....	17-9
	Use the Running Context.....	17-9
	If You Want to Abort Import.....	17-9
	What You See in the Display.....	17-9
	Display Areas.....	17-11
	How to Create an A-B ASCII File.....	17-11
	Let's Begin.....	17-12
	How to Build Your File.....	17-12
	Keywords.....	17-13
	What Goes in the A-B ASCII File.....	17-13
	Symbol.....	17-13
	Address Comment.....	17-14
	Instruction Comment.....	17-14
	Rung Comment.....	17-15
	How to Document Your A-B ASCII File.....	17-15

<u>Chapter</u>	<u>Description</u>	<u>Page</u>
18	Delete Context	
	Delete Context.....	18-1
	Rules for Delete Context.....	18-1
19	Miscellaneous Features	
	Save and Continue.....	19-1
	Report Extensions.....	19-1
	Enter Printer Escape Sequences.....	19-2
	Assemble Edits.....	19-2
	Save Report Titles.....	19-2
	Printer Configuration.....	19-2
20	T45, 6122 and IBM XT Information	
	Introduction.....	20-1
	T45 Information.....	20-1
	T45 Cabling.....	20-1
	T45 Communication Configuration.....	20-1
	T45 Instruction Intensification.....	20-2
	T45 Display Contrast and Brightness.....	20-2
	T45 Internal Modem.....	20-2
	6122 Information.....	20-3
	IBM XT Informatin.....	20-3
21	Additional Information About the Software	
	Additional Information.....	21-1
22	2.0 Editing Changes	
	Chapter Objecctives.....	22-1
	Cursoring in Ladder Editor.....	22-1
	Input Line Cursoring.....	22-1
	Cursoring Between Rungs and Instructions.....	22-1
	Cursoring Between Pages.....	22-1
	Moving Between Rungs.....	22-2
	Multiple Instruction and Address Entry.....	22-2
	Edit Buffer.....	22-2
	Auto Document.....	22-3
	Symbols.....	22-3

<u>Chapter</u>	<u>Description</u>	<u>Page</u>
23	2.0 File Option Changes	
	Chapter Objectives.....	23-1
	Merging Documentation Files.....	23-1
	Configuring the Merge Function.....	23-2
	Transferring Files.....	23-4
	Transferring Files To/From a Directory.....	23-5
	Transferring Files To/From SB.....	23-8
24	2.0 Report Generation Changes	
	Chapter Objectives.....	24-1
	Creating/Viewing Reports.....	24-1
	Defining Directory Paths.....	24-1
	Variable Report Width and Length.....	24-2
25	Smart Menu	
	Smart Menu.....	25-1
	Starting the Smart Menu.....	25-3
	Configuring the Smart Menu.....	25-3
<u>Appendix</u>	<u>Description</u>	
A	PLC-3 Instructions	
B	Error Messages	
C	Cable Pinouts	
D	Switch Settings and Cable Connections	
E	LIST Function	
F	Instruction Main Addresses	
G	File Types and Extensions	
H	Sample Reports	

Manual Objectives

In this manual you read about how to use the PLC-3 Programming Software. We realize that you do not want to read all of this manual. You want to read only those sections that help you to complete your task. Before beginning, however, please read the following chapters completely:

Chapter 1 - Using This Manual

Chapter 2 - Software Overview

These chapters contain information that you need to know, regardless of the tasks you perform.

Audience

To effectively use this software, you should have a working knowledge of:

- . Allen-Bradley's PLC-3 Family of programmable controllers.
- . your programming terminal (1784-T45, T50 or IBM AT or compatible computer).

Warnings, Cautions and Important Information

You see three types of precautionary statements as you read this manual:

- . **WARNING** - makes you aware of instances where personal injury may occur.
- . **CAUTION** - makes you aware of instances where equipment damage may occur.
- . **Important** - points out specific areas of concern in a process or operation.

Related Publications If you would like more information on programmable controllers, consult our publications index (publication SD499). This index lists all available publications for Allen-Bradley products. You can also refer to the following publications.

Title	Publication Number
PLC-3 Family Programming Manual	1775-6.4.1
PLC-3 Family Installation and Operations Manual	1775-6.7.1
T45 User's Manual	1784-6.5.7
T50 User's Manual	1784-6.5.1
MS-DOS User's Guide	1784-6.5.2
1775-KA User's Manual	1775-6.5.1
1775-S4A, -SR User's Manual	1775-6.5.2
1775-S4B User's Manual	1775-6.5.3
1775-GA User's Manual	1775-6.5.4
1775-S5 User's Manual	1775-6.5.5
Data Cartridge Recorder User's Manual	1770-6.5.4

Conventions

We use certain conventions in this manual when we describe how to enter information into the terminal.

Words in square brackets represent actual keys that you press, like this: **[ENTER]**.

Terms and Definitions

We use terms throughout this manual with which you should become familiar.

File - the word file in this manual has two uses:

- refers to a DOS file. DOS files are report files, log files, GA, DH procedure files
- PLC-3 file addresses and file instructions

Program - A portion of memory (which may reside in the processor or in the terminal as an archive file).

Program Directory - A screen display that lists each of the contexts and their names.

Terminal - A T45, T50, IBM-AT or compatible computer.

Processor - A PLC-3 Family processor.

Data Table Order - The order that addresses appear in the PLC-3 data table section of memory. See the table that follows:

Data Table Sections (in order)	Section Specifiers
Output image	O
Input image	I
Timer	T
Counter	C
Integer	N
Floating point	F
Decimal	D
Binary	B
ASCII	A
High order integer	H
Pointer	P
Status	S

Cross reference, data table and memory usage reports let you select an address range. These address ranges appear in data table order.

Chapter Objectives

In this chapter, you read about how the software works, how you use the keys and the top and 2nd level menus.

Software Functions

The PLC-3 programming software (the software) lets you program and monitor a PLC-3 Family processor using a 1784-T50 or 1784-T45 terminal or an IBM/IBM-compatible computer (referred to throughout this document as the "terminal").

While using the software, you can:

- . edit or monitor an existing program **online**
 - . edit or monitor an existing program **offline**
 - . transfer a program between the processor and the hard disk, and SB recorder
 - . document a program
 - . generate and print program documentation reports
 - . configure processor and terminal communications
 - . force I/O points
-

Hardware Requirements

Before you can use the software, you need this computer hardware:

- . 10 Mbyte hard disk
- . 640 Kbytes RAM
- . floppy disk drive (5 1/4" or 3 1/2")
- . monochrome or color monitor
- . 1 Mbyte of expanded or extended memory (for offline programming)
- . Printer interface is parallel or serial.

Your operating system must be:

- . MS-DOS 3.2 (T50)
 - . MS-DOS 3.1 (T45) or
 - . MS-DOS/PC-DOS, Version 3.1 or later (5 1/4" media)
-

Running the Software

Before you use the software set channel timeouts at 0 on the channel that you communicate through.

Make sure that your CONFIG.SYS file contains the following statements:

T50 and compatibles

```
FILES = 20
BUFFERS = 16 (or any number between 16 and 30)
DEVICE = ANSI.SYS
```

T45

```
The three lines shown above for the T50 and
DEVICE = EMM.SYS M1 I5
```

Note: If ANSI.SYS (or EMM.SYS) is not in the root, you must include the path that contains ANSI.SYS (or EMM.SYS) in the DEVICE statement above.

You run the software in one of the following ways:

If You Want to:

Have immediate access to PLC programming software as well as other programming packages

Choose communications connections and select any processor on the DH+ network before using the software for programming

Have immediate access to PLC programming software

Choose This Method:

Use the Smart Menu
(refer Chapter 25)

Use the DH + Network Menu
(refer to the WHO function
later in this chapter)

Type IT from the DOS
 \IPDS\ATTACH\PLC3 directory

The top menu appears:

```

PLC-3 PROGRAMMING SOFTWARE
A 6200 Series Software Product
Copyright 1986, 1987, 1988, 1989, Allen-Bradley Company, Inc.
All Rights Reserved
Release 2.0
This software is licensed to: Company Allen-Bradley
Location PC Division
Highland Heights, Ohio
Thur Dec 29, 1988 Current Offline File: STATION4 2:08:23 pm
Terminal Address: 60 Current Device: 1784-KL (DH+) PLC Address: 14

```

Press a function key

Online Prg/Doc	Online Config	Offline Prg/Doc	Offline Config	Who	System Config	File Options	Print/ View	Exit System
F1	F2	F3	F4	F5	F6	F7	F8	F10

The Top Menu of the Programming Software

NOTE: The [F5] - Who function key will not appear on this menu if you are not connected to the processor via Data Highway Plus.

Keys You Use

The list of keys below lets you enter and edit the information you type on the input line or data entry window on a screen. These keys perform the same way on every screen in the menu system.

If You Want to:	Press This Key:
Delete the character to the left of the cursor on the input line	[Backspace] [CTRL] [H]
Delete the character that the cursor is on	[DEL]
Delete from the cursor to the end of the input line.	[CTRL] [J]
Delete from the left of the cursor to the beginning of the input line.	[CTRL] [U]
Delete all the information on the input line.	[CTRL] [X]
Move the cursor one character to the left on the input line	[CTRL] [D] left arrow
Move the cursor one character to the right on the input line.	[CTRL] [F] right arrow
Move the cursor to the beginning of the input line	[CTRL] [B]
Move the cursor to the end of the input line.	[CTRL] [E]
Move the cursor one field up, down, to the left, or to the right	up, down left, and right arrow keys
Move the cursor to the top or bottom of the screen if more than one screen of information is available	[PageUp] [PageDown]

If You Want To:	Press This Key:
Toggle between insert and delete mode when you type information on the input line	[INS] [CTRL] [A]
Recall the previous input line you entered.	[CTRL] [R]
Accept the information you typed or selected and return to the previous screen	[ENTER] [ESC] [CTRL] [M]
Do not accept the information you typed or selected	[ALT] [U]

Operator Prompts

When you use the software, various prompts appear at the bottom of the displays. For example, here is a prompt you see.

- **Press a function key** - lets you enter selections on a display by pressing function keys [F1] - [F10]

The top menu shows the pathways into the menu system and an exit to DOS. To select a pathway, press any of the function keys.

Next we discuss each function key in the top menu. The only key on this menu that connects you to the processor is Online Prg/Doc, the first function we cover.

Online Programming/Documentation [F1]

The Online Programming/Documentation selection establishes communication with the processor and lets you create and edit ladder programs. We call this menu the 2nd menu.

You can document programs with rung and instruction comments and symbols. We describe the Online Programming and Documentation utility in detail in Chapters 4 through 16. Information on the next menu you see after you press [F1] is provided later in this chapter (see 2nd menus).

You use the Online Prg/Doc key in conjunction with [F8] - Monitor Programs, to get to your ladder programs.

Online Configuration [F2]

This option lets you specify the mode of communication between the processor and programming terminal. The default communication is the 1784-KTP. Chapter 3 explains how to configure communications.

Offline Programming/ Documentation [F3]

This option lets you create and store ladder programs in your terminal without attaching to the processor. You can later retrieve these programs for execution by the processor.

Offline gives you the same features and functions you have in online except for contact histograms. Some of the tasks you can perform offline (in addition to ladder editing, documentation and data value entry) include setting up force tables and creating report generation and Data Highway messages.

Important: Your programs are stored in computer RAM until you save them to the hard disk. While programming offline, you should periodically save your programs. If your terminal loses power, any edits made since you last saved a program are lost. Also, **always** save your program **before** pressing [F6] - Create Reports.

Important: In addition to saving your programs to the hard disk, you should also exit the software periodically and make a backup of your programs to another directory or to a floppy disk from DOS. This gives you additional protection against the loss of your programs.

The menu you see after you press [F1] is covered later in this chapter (see 2nd Menus).

Offline Configuration [F4]

Offline configuration lets you create or select a program containing ladder and report files from the hard disk for offline editing. See Chapter 3 for details.

Using the WHO Utility [F5]

If you are connecting to a processor over Data Highway Plus, you can see what processors and devices are on the highway by pressing [F5] and then selecting between Who active and Who listen described below. You can also start the programming software through the WHO utility. By doing this, you can select DH+ communication configurations and select the processor you want to use before you start the software. This is useful if there are several different programmable controllers installed on the Peer Communication Link because you can select the device you want to use.

To start the software through WHO:

1. Start at a DOS prompt.
2. Change the directory to:

\IPDS\ATTACH

3. Type: WHO [ENTER]

You see the DH+ Network screen.

DH+ NETWORK MENU		
A 6200 Series Software Product Copyright 1988, Allen-Bradley Company, Inc. All Rights Reserved		
Thur Dec 29, 1988		3:19:23 pm
Terminal Address: 60	Current Device: 1784-KTK1	PLC Address: 14

Press a function key

Online Prg/Doc	Online Configr
F1	F2

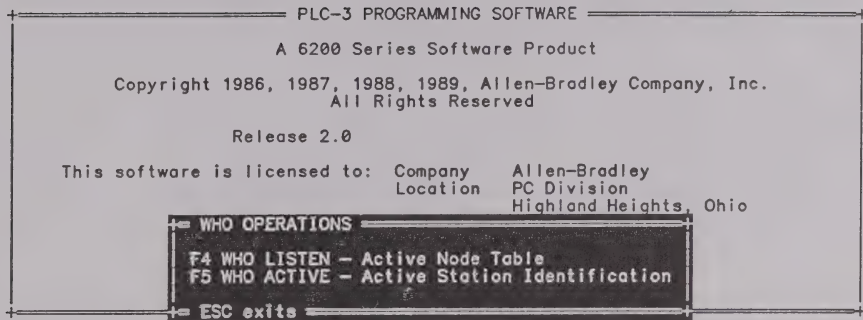
Who Listen	Who Active	System Configr
F4	F5	F6

Exit System
F10

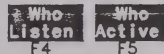
DH+ Network Screen

To select WHO from the top menu:

Press [F5]. You see the who operations screen.



Press a function key



WHO Operations Screen

From the DH+ Network screen or WHO operations screen you can choose the following:

Key:	Function:
[F4] - WHO Listen	Indicates the active stations on the Data Highway + (DH+). The WHO Listen function is only available if 3 or more stations are on the network link.
[F5] - WHO Active	Displays a table identifying all devices on the DH+.

If you start the software through the WHO utility, the configuration for WHO becomes the configuration that the system uses for the entire session. For example, if you attach to one programmable controller, the software uses the configuration stored for WHO. Then, if you return to the DH+ Network screen and attach to a different programmable controller, the same configuration is still active. This configuration remains active until you change the configuration or exit the software.

WHO Listen

The WHO Listen screen displays the active node table, which is a listing of the devices connected to the DH+. From this screen, you can configure communications.

To configure communications, do the following:

1. Start on the DH+ Network or WHO operations screen.
2. Press [F4] - WHO Listen.

The system displays the WHO LISTEN screen.

DH+ NETWORK MENU									
A 6200 Series Software Product									
Copyright 1988, Allen-Bradley Company, Inc.									
All Rights Reserved									
WHO LISTEN - Active Node Table									
0	10	20	30	40	50	60	70		
00001001	10000000	01000000	11000111	11110111	00101101	01110000	00000000		
ESC exits									

Press a function key

Online
Config
F2

WHO Listen Screen

A one (1) at an address on this screen indicates that a station is active at that address.

3. Press [F2] - Online Configuration.

The system displays the Online Configuration screen.

From the Online Configuration screen, you can select the current device and the communications information for that device. This configuration screen is the same screen that you see when you choose [F2] - Online Configuration from the main menu.

If you start the system from WHO, the configuration characteristics you set in WHO are active. If you start the software through the PLC programming software menu, the configuration characteristics set through the main menu are active. In effect, the WHO utility gives you the capability to change the online configuration for your current needs without changing the overall configuration that was set through the main menu.

For information about using the Online Configuration screen, see "Configuring Online Characteristics" in Chapter 3.

Note: The default communication configuration for the software assumes that you use a 1784-KTP. If this is not the case, you must first configure the correct communication device for your system through Online Configuration before you can use the WHO Listen feature to configure communications.

WHO Active

The WHO Active screen displays a table that identifies the devices that are attached to the DH+. Through this screen, you can choose the processor you want to use.

To get to the WHO Active screen, do the following:

- 1. Press [F5] - WHO Active.

The system displays the WHO Active screen.

DH+ NETWORK MENU									
A 6200 Series Software Product									
Copyright 1988, Allen-Bradley Company, Inc.									
WHO ACTIVE - Active Station Identification									
0	10	20 TERM	30 5/15	40 5/25	50	60	70 PLC3		
1	11	21 PLC3	31	41	51	61	71		
2	12	22	32	42	52 5/15	62	72		
3	13	23	33 5/25	43	53	63	73		
4	14	24	34	44 TERM	54	64	74		
5	15	25	35	45 TERM	55 5/25	65	75		
6	16	26	36 5/15	46	56 KF2	66	76		
7	TERM	17	27	37	47	57 85KA	67	77	
ESC exits									

Press a function key

Online Station
Prg/Doc Diags
F1 F2

WHO Active Screen

The flashing "TERM" identifies the terminal you are using. The other flashing identification indicates DH+ station currently in your configuration.

From the WHO Active screen, you can do the following:

Key:

Function:

[F1] - Online Prog/Doc

Attaches the terminal to the processor specified by the cursor. This is an alternative to specifying a PLC address through the online configuration utility.

[F2] - Station Diagnostics

Displays diagnostics for the device you specify.

Use the up, down, right, and left arrow keys to move the cursor to the device you want and then press [F2].

Getting Station Diagnostics

The WHO diagnostics information is available through the WHO Active screen. This information lists diagnostic counter information for the device you specify on the WHO Active screen.

You can specify diagnostics for any device that is connected to the DH+ network. To get station diagnostics, do the following:

1. Start on the WHO Active screen.
2. Place the cursor on the device for which you want the diagnostics information.
3. Press [F2] - Station Diagnostics.

The system displays the diagnostics screen for the device you specified.

```

WHO ACTIVE - Active Station Status
Messages Transmitted      2799
Messages Received         2800
Responses Timed out       0
Aborted Packets Rcv'd    18
NAKS: Isap Rcv'd         0
Illegal Packet Size       239
Duplicate Node Seen       0

Link Deadtime             0
Nak No Mem Sent           0
NAKS Rcv'd                0
Duplicate Packets         0
Token Timeouts            0
Retries                   0
Duplicate Token           0
Undeliverable             0

ESC exits [ Packet Delay - 0 ]

```

Press a function key to control counters or use to adjust packet delay.

RUN

Clear	Freeze	PLC-3
Counter	Counter	Filter
F2	F3	On
		F4

DH+ Addr .71

Diagnostics Information

See the documentation for the device you choose for an explanation of its diagnostic counters.

You can perform the following tasks from the diagnostics screen:

Key:	Function:
[F2] - Clear Counter	Resets the diagnostic counters.
[F3] - Freeze Counter	Toggles between Lock and Unlock. The counters display status information about the current device. Lock stops the counters from changing on the screen. The counters continue to run in the background, so when you press Unlock, the counters start from the actual values.
[F4] - Filter On	Toggles between On and Off. If the filter is on, the diagnostics counters do not record information about the packets the terminal is sending. The counters only record information about packets the processor sends or receives from other stations.

With each transmission, two packets are sent. If you turn the filter on, you remove the packet activity of your terminal from the diagnostic counters. This is useful for tracking messages that are sent to a device from another station. For example, if one PLC-3 sends messages to another station, the filter shows whether the packets are being sent at the correct intervals.

Packet Delay - On the diagnostics screen, you can use the up and down arrows to set packet delays. Delays reduce traffic on the network by increasing the amount of time between packet transmissions. Diagnostic routines send commands at a high rate, but sometimes conditions on the network do not change quickly enough in the diagnostic routines to justify the high transmission rate.

The up arrow increments the delay by one second; the down arrow decreases the delay by one second. The packet delay ranges from 0-10 seconds. The default delay is 0 seconds.

System Configuration [F6]

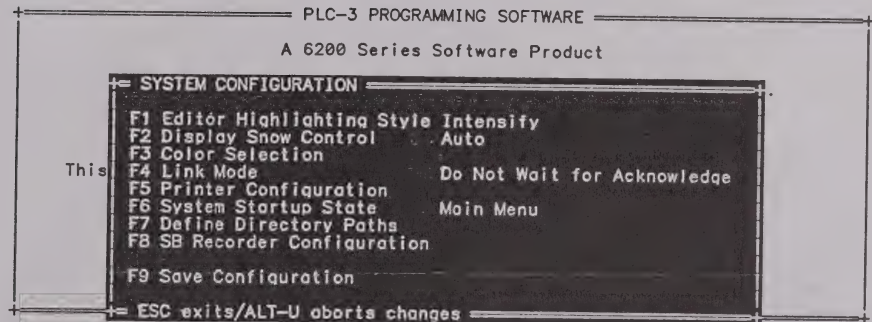
This function lets you configure the display characteristics of your terminal. You can configure the following system characteristics:

- . Editor highlighting
- . Snow control
- . Color
- . Link Mode
- . Printer configuration
- . System startup state
- . Define directory paths

To configure system characteristics, do the following:

1. Start on the main menu.
2. Press [F6] - System Configuration.

The system displays the System Configuration screen.



Press a function key



System Configuration Screen

3. Press the soft-function key for the characteristic that you want to configure.
4. Press [F9] - Save Configuration to save the changes.

This saves the configuration characteristics you specified on this screen only. If you make changes on other configuration screens, you must save the configuration on those screens if you want the configurations saved to your user configuration file.

After you press [F9], the configuration information remains the same each time you start the software.

If you want to change the configuration information for this editing session only, press [ENTER] or [ESC] after you change the appropriate information. The changes remain until you exit the software.

You can specify the following system characteristics from the System Configuration screen:

Key:	Function:
[F1] - Editor Highlighting	Toggles between intensify and reverse highlighting video modes for the display of active (on) screen elements. Use reverse for LCD displays, such as the T45 display.
[F2] - Snow Control	Toggles between Auto and Off. Auto specifies that snow control is on. Snow control helps solve synchronization problems with CGA monitors, however, it also slows down the time it takes for a screen to update. The default is Off. Off specifies that you do not want to use snow control. Off is the setting to use for faster screen displays. You can experiment with snow control to see which configuration works best for your terminal.
[F3] - Color Selection	Lets you choose colors for the display fields on screens.
[F4] - Link Mode	Lets you choose whether to wait for an acknowledgement or not when you transmit packets (only Data Highway Plus)
[F5] - Printer Configuration	Lets you specify the printer characteristics.

[F6] - System Startup

Toggles between the following options as the first screen the software displays. (Main Menu is the default.)

Main Menu

- Online Context Directory (Online Programming Documentation)

- Online Ladder Editor (Ladder Editor main menu)

- Offline Context Directory (Offline Programming Documentation)

- Offline Ladder Editor (Ladder Editor main menu)

[F7] - Define Directory
Paths

Lets you specify where you want to store files

[F9] - Save Configuration

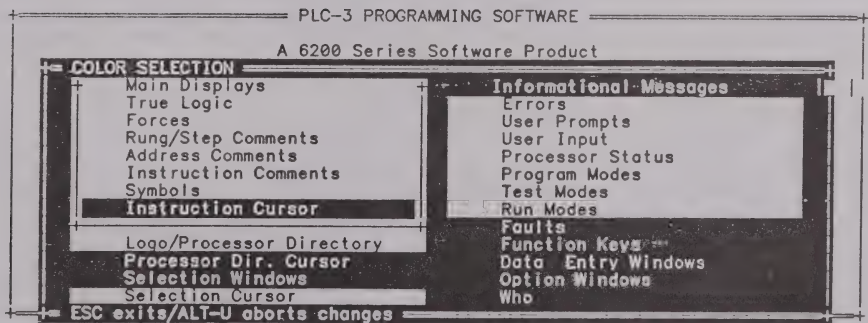
Saves the configuration you specify

Selecting Colors

To select colors for the different areas on the screen, do the following:

1. Start on the System Configuration screen.
2. Press [F3] - Color Selection.

The system displays the Color Selection screen.



Press a function key

Mono/ Recall
Off/Cir LastCir
F1 F2

Backgrnd Forgrnd
Color Color
F5 F6

Save
Config
F9

3. Place the cursor on the display item for which you want to specify a color.

You can perform the following tasks on the Color Selection screen:

Key:	Function:
[F1] - Mono Color or Default Colors	Lets you toggle between a black and white display or a display using the default colors.
[F2] - Recall Last Color	Restores the last color that was saved before the current programming session. Configurations saved for the current session are not recalled.
[F5] - Background Color	Toggles through the 8 available color choices for backgrounds.
[F6] - Foreground Color	Toggles through the 16 available color choices for foregrounds.
[F9] - Save Configuration	Saves the colors you specified. Press [ENTER] or [ESC] if you want to save the color configuration for this editing session only.

The Color Selection screen lists the items for which you can select colors. The items in the box in the upper-left corner of the screen use the same background. When you specify a background for one of these items, that color is used for the background for all the items in that box. You can specify separate foreground colors for those items though.

Specifying Link Mode

The link mode option lets you choose whether or not to wait for acknowledgements when you transmit packets. The choices are:

Wait for Acknowledgment

If your network environment is noisy or produces frequent transmission errors, you want this option. The wait for acknowledgement option tells the terminal to wait for an acknowledgement from the processor that the processor received the last packet. Following the acknowledgement, the processor sends a reply.

If the terminal does not receive an acknowledgement, the terminal re-sends the packet. If after four transmissions, the terminal does not receive an acknowledgement, you receive an error message stating that processor did not respond.

Do Not Wait for Acknowledgement

This option greatly reduces transmission time because it allows the terminal to send a packet without waiting for an acknowledgement from the processor.

If the terminal does not receive a reply, it re-sends the packet and requests an acknowledgement. If after four transmissions, the terminal does not receive an acknowledgement, you receive an error message stating that processor did not respond.

The do not wait for acknowledgement option is useful for reliable network environments because it eliminates the time needed for receiving an acknowledgement on the first transmission of a packet.

Specifying Printer Characteristics

To specify the printer characteristics, do the following:

1. Start on the System Configuration screen.
2. Press [F5] - Printer Configuration.

The system displays the Printer Configuration Screen.

3. Press the soft-function key for the characteristic that you want to change.
4. Press [ENTER] or [ESC]

For more information about configuring printers and using the Printer Configuration screen, see "Generating and Printing Reports" in Chapter 16.

Defining Directory Paths

You can define the paths where you want the system to store certain files. You can define directory paths for the following files:

- . Processor comments and symbols
- . Documentation Reports
- . Exported comments and symbols
- . User configuration

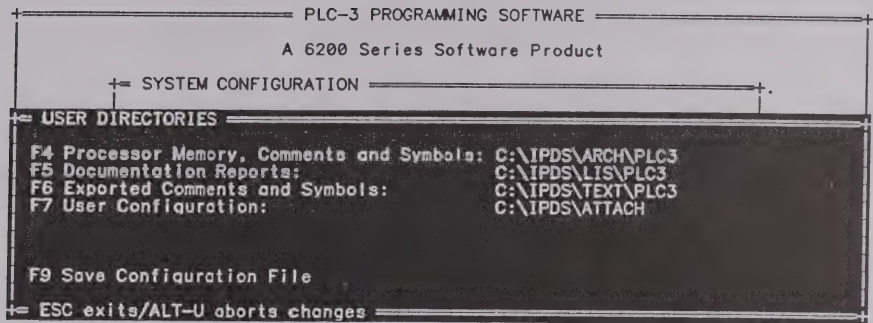
Defining directory paths lets you determine where files are stored. In this way, you can organize the processor files on your disk.

To define these directory paths, do the following:

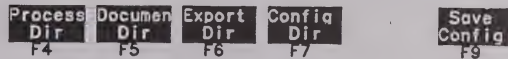
1. Start on the System Configuration screen.

2. Press [F7] - Define Directory Paths

The system displays the current paths.



Press a function key



Define Directories Screen

3. Press the soft-function key for the path you want define.
4. Type in the new path.

If you do not specify a drive, the system system uses the current drive to store the files.
5. Press [ENTER].
6. Press [F9] - Save Configuration to save the directory paths that you define.

After you press [F9], the directory paths you specify remain the same each time you start the software.

If you want to use these directory paths for this editing session only, press [ENTER] or [ESC] after you specify the paths. These paths remain until you exit the software.

User Configuration Files

User configuration files let you store your own configuration preferences for your own use. This is especially useful when the software is used on a network. Each user has individual configurations without changing those of the other users.

Another advantage to user configuration files is that you can store your configuration on a diskette. Then you can use any available programming terminal and use your configuration from the floppy drive.

To create or modify a user configuration file, do the following:

1. Start on any screen in the software that lets you choose a configuration and that has a soft-function key labeled "Define Directory."
2. Change the configuration.
3. Press the soft-function key labeled "Define Directory."

The system lets you define directory paths for the user configuration file.

4. Press the soft-function key for the user configuration file.
5. Type the drive and directory for your configuration file.

For example:

```
c:  
c:\ipds\program  
c:\test
```

If this is a new directory, the system asks you whether to create the directory path.

If the directory already has a configuration file, you will be asked if you want to use the existing configuration. If the directory has no configuration file, you will be prompted to save your configuration changes.

6. Press the soft-function key labeled "Save Configuration."

This saves the configuration characteristics you specified on this screen only. If you make changes on other configuration screens, you must save the configuration on those screens if you want the configurations saved to your user configuration file.

File Options [F7]

This option allows you to:

- . [F3] - **rename** disk files
- . [F4] - **copy** disk files
- . [F5] - **delete** disk files
- . [F6] - **import** or transfer symbols, instruction address, and rung comments from an A-B ASCII file into the software database. The A-B ASCII file must follow a specified format that we describe in this manual. Refer to Chapter 17 for more information.
- . [F7] - **export** or transfer symbols, instruction, address and rung comments from the software database to an A-B ASCII file. Refer to Chapter 17 for more information.
- . [F8] - **merge** disk files. Refer to Chapter 24 for more information.
- . [F9] - **transfer** disk files to/from a floppy disk and to/from SB. Refer to Chapter 24 for more information.

Renaming Files

1. Press [F3] - Rename. You have the choice of:
 - . [F1] - Processor Memory File
 - . [F3] - Comments and Symbols
 - . [F4] - Export comments and symbols
 - . [F5] - Documentation Reports
 - . [F6] - All of the Above
2. After selecting an option, move the cursor to the program that you want to rename and press [F3] - Select Source. You can also search for a program name by entering the program name (or the first several letters of the name).
3. Press [F4] - Enter Destination and type the new file name, then press [ENTER].
4. You can now press [F1] to rename the file or [ESCAPE] to abort the change.

Copying Files

1. Press [F4] - Copy. You have the choice of:
 - . [F1] - Processor Memory File
 - . [F3] - Comments and Symbols
 - . [F4] - Export comments and symbols
 - . [F5] - Documentation Reports
 - . [F6] - All of the Above
2. After selecting an option, move the cursor to the program that you want to copy and press [F3] - Select Source. You can also search for a program name by entering the program name (or the first several letters of the name).
3. Press [F4] - Enter Destination and type the new file name, then press [ENTER].
4. You can now press [F1] to copy the file or [ESCAPE] to abort the operation.

Deleting Files

1. Press [F5] - Delete. You have the choice of:
 - . [F1] - Processor Memory File (also deletes cross reference files)
 - . [F2] - Cross Reference Information (only)
 - . [F3] - Comments and Symbols
 - . [F4] - Export comments and symbols
 - . [F5] - Documentation Reports
 - . [F6] - All of the Above
2. After selecting an option, move the cursor to the program that you want to delete and press [F3] - Select Name. You can also search for a program name by entering the program name (or the first several letters of the name).
3. Press [F1].
4. You can now press [F8] - Yes to delete the program or [F10] - No or [ESCAPE] to abort the operation.

Print/View Reports [F8]

Use this utility to print reports that you generated. See chapter 16, "Generating and Printing Reports" and chapter 25, "Report Generation Changes".

Exiting From the Menu System [F10]

Depending on where you are in the menu system, you use certain key strokes to exit from the system.

1. From the top menu you can press [F10] - Exit **System**.
2. You can press [ESCAPE] repeatedly from most points in the menu system to exit to the top menu. In certain cases, you use a function key to exit from a task.
3. If you are in the 2nd menu or the Monitor Program menu, [F3] Return to Menu returns you to the menu above.

2nd Menus

For Online Programming and Documentation

When you press [F1] Online Prg/Doc from the top menu, you see the 2nd menu:

PLC-3 PROGRAMMING SOFTWARE						[ONLINE]
RUNNING CONTEXT	CONTEXT NAME	DATA TABLE	PROGRAM	MESSAGE	TOTAL	
1	STATION5	621	51	0	673	

Press a key.

RUN		Mem: Unprotected				PLC-3 Addr 71	
Process Funcins	Save Restore	Return to Menu	Change Station	Who Active	Create Reports	Dir Display	Monitor Program
F1	F2	F3	F4	F5	F6	F7	F8

Menu you see when you select Online Programming and Documentation (Function Keys [F4] - Change Station and [F5] - Who Active appear if you are on line over DH +)

When this screen appears, you see information about the current context at the top of the display. What you see is a memory map of key areas of PLC-3 memory. All sizes are in words.

You also see the heading "Name". This column shows the titles of your programs. If you see <NONAME> in this column, you need to supply a name for a program. This can be done when you:

- Save Context
- Create Reports
- Monitor Program
- Change Name

The name you enter can have up to 8 characters:

- letters A-Z (upper and lower case)
- numbers 0-9
- underscore character _

The next line of information you see on the 2nd menu is the status line. This line appears directly above the menu selections. The status lines tells you:

- processor mode - run, test, program or faulted
- protection - memory protected or unprotected
- connection - direct or station address on Data Highway Plus

The functions you can select from the 2nd menu are described in the remaining chapters of this manual, except:

- [F4] Change Station lets you connect to another station by specifying a starting address (available only when you are on DH+)
- [F5] WHO Active shows you stations numbers and devices connected to the network you are on. We covered WHO functions earlier in this chapter (available only when you are on DH+)
- [F7] Directory Display - this displays information about all contexts that exist in the PLC-3 processor
- Page Up, Page Down keys - allow you to move between the pages of your directory. These keys are only relevant if there is more than one page of contexts in your directory.

For Offline Programming and Documentation

When you press [F3] from the top menu, you see this menu:

PLC-3 PROGRAMMING SOFTWARE					
RUNNING CONTEXT		[OFFLINE]			
CONTEXT	NAME	DATA TABLE	PROGRAM	MESSAGE	TOTAL
1	STATION4	610	51	0	663

Press a function key.

Program		Mem: Unprotected		PLC-3 File STATION4	
Processr	Save &	Return	Change	Create	Monitor
Funcns	Continue	to Menu	File	Reports	Context
F1	F2	F3	F4	F6	F8
					F10
					FI Conv
					Utility

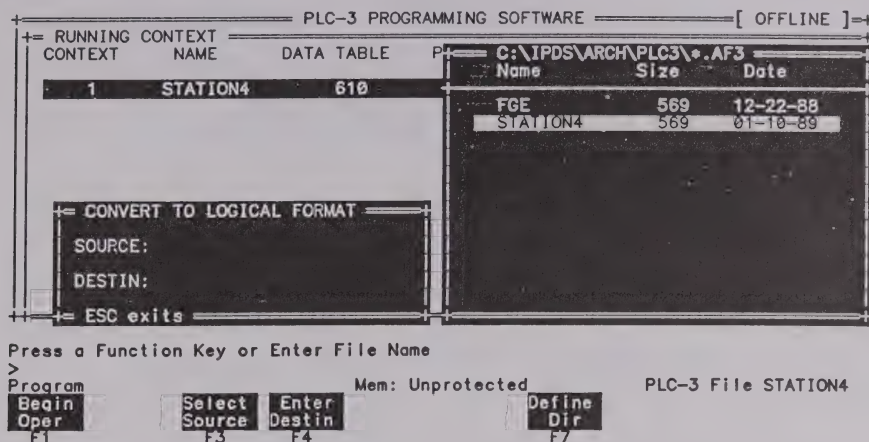
Menu you see when you select Offline Programming and Documentation

The functions you can select from this second menu are:

- . [F1] Processor Functions - lets you :
 - Change processor memory size in Kwords [F1]
 - Clear all program and data files from processor memory [F4]
 - Monitor Context (enter ladder editor) [F8]
 - Rename Context (rename program 8 characters max) [F9]
- . [F2] Save and Continue - allows you to save processor and database files. Answer yes or no to prompt.
- . [F3] Return to Menu - takes you to the top menu
- . [F4] Change File - brings up the offline configuration screen (described in Chapter 3) so you can select a new file to work with.
- . [F6] Create Reports - takes you to the Report Utility. See Chapter 16 for details.
- . [F8] Monitor Context - takes you into the Ladder Editor described in the following chapters of this manual.
- . [F10] F1 Convert Utility - takes a program on which have performed a context save and converts it to an offline file on which you can perform offline editing. Or, it takes an offline file and converts it to a logical context ready for downloading. See the next section for details.

F1 Convert Utility

Programs created or edited offline need to be converted to the .ACH format that can be restored to the processor. Program files that were "context" saved (.ACH) need to be converted into an offline format in order to be edited offline. To accomplish either of these tasks, press [F10] from Offline Programming menu. You'll see this menu:



Convert to/from .ACH Menu

Convert to .ACH

To convert to a .ACH File which can then be restored to the processor:

1. Enter the name of the Offline file you want to convert or select the source from the directory displayed by cursoring to the file and press [F3] Select Source.
2. Press [F4] Enter destination and enter destination file name with an extension .ACH.
3. Press [F1] to begin the operation.

Convert from .ACH

To convert an .ACH File to one which can be edited offline:

1. Enter the name of the .ACH file you want to convert or select the source from the directory displayed by cursoring to the file and press [F3] Select Source.
2. Press [F4] Enter destination and enter destination file name for the offline file.
3. Press [F1] to begin the operation.

Chapter Objectives

This chapter covers online configuration and offline configuration. You use **online configuration** to configure communications between your computer and a PLC-3 processor; coverage of this task starts below.

You use **offline configuration** to select or create a processor file; coverage of this task starts on page 3-19.

Important: Before you use the software you need to set channel timeouts to 0 on the channel that you are communicating through.

Online Configuration

Select Online Configuration by pressing [F2] at the top menu. This option lets you specify whether you are using a:

- . 1784-KTK1 module (Data Highway Plus Protocol) for connection over Data Highway Plus
- . 1784-KTP module (BCL Protocol) for direct connection to a processor
- . 1784-KL (Data Highway Plus or BCL Protocol)
- . 1784-KT (Data Highway Plus or BCL Protocol)
- . Serial Port - COM1 or COM2 (Data Highway Plus Protocol)

The first time you use the software, the online configuration menu displays the communication for the 1784-KTP. This is the default configuration.

If you want a different configuration, press [F2] until you see the configuration screen you desire. Then, change parameters to describe your configuration. To save your configuration, press [F9]. It appears on the screen thereafter.

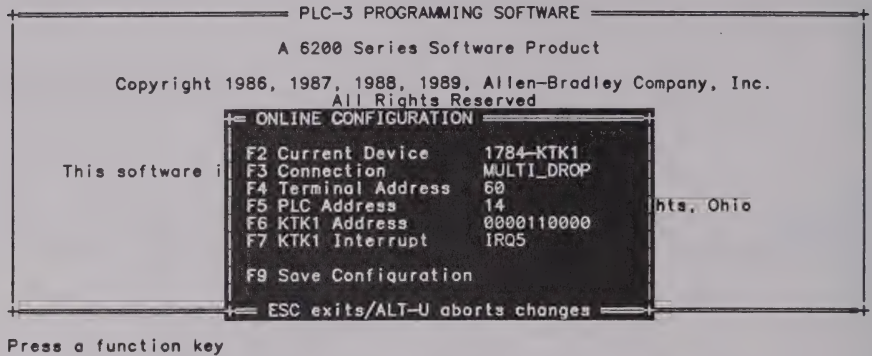
This table shows you connections for connecting directly or via Data Highway Plus to a processor. We illustrate cable pinouts in appendix C. Appendix D shows cable connections.

<u>Direct Connection</u>	<u>Data Highway Plus Connection</u>
1775-S4A	1775-S5
1775-GA	1775-SR5
1775-RM	
1775-SR	
1775-S5 (via front panel)	
1775-SR5 (via front panel)	
front panel	

Refer to the instructions that follow to configure your system for online programming.

Configuring a 1784-KTK1

The 1784-KTK1 configuration screen looks like this:



Select Device	Connect Type	Term Address	PLC Address	KTK1 Address	KTK1 Intert	Save Config
F2	F3	F4	F5	F6	F7	F9

1784-KTK1 Configuration Screen

You can change the following configuration information for the 1784-KTK1 board (Data Highway Plus protocol):

[F3] - Connection Type toggles between DIRECT and MULTI_DROP.

Select direct if your terminal is at the end of the DH+ network and has a termination resistor.

Select multidrop if the terminal is not on the end of the DH+ network and that terminal does not have a termination resistor.

[F4] - Terminal Address prompts you to change the current Data Highway Plus address of your terminal on the DH+ network. If you want to change the address, enter a new one (0 - 77 in octal). Select any valid address as long as no other station on the data highway has that address.

[F5] - PLC Address prompts you to enter the Data Highway Plus address, in octal (0 - 77), of the PLC-3 that you want to monitor. This address corresponds to the switch settings in the 1775-S5 or the 1775-SR5. No two stations on Data Highway Plus can have the same address.

[F7] - **1784-KTK1 Interrupt** prompts you for the interrupt (1784-KTK1 Series B only). The KTK1 is factory set for IRQ5. If this conflicts with another board in your computer (such as the hard disk in an IBM PC/XT), you can select from IRQ3, IRQ10, and IRQ12.

If you change the interrupt, change the configuration plug on the KTK1 board to correspond to the interrupt you selected.

6122 Considerations

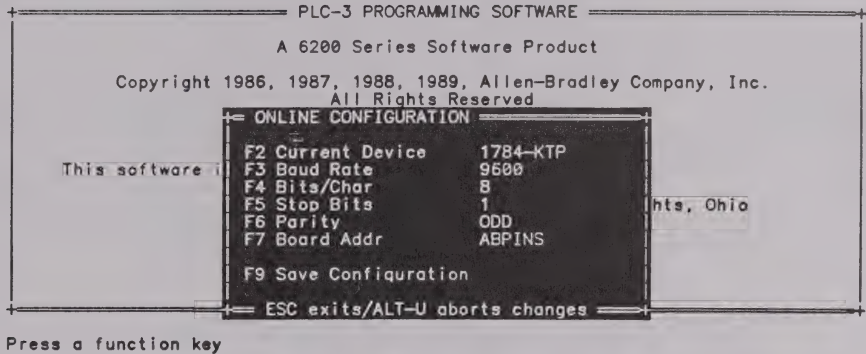
If you are using a 6122, set the KTK1 address to 0100110000. Also, change the DIP switch settings on the KTK1 board to reflect the address. See the 1784-KTK1 product data (publication 1784-2.3) for instructions about setting DIP switches.

IBM XT Considerations

If you are using an IBM XT, you can only use IRQ3. You cannot use IRQ5 because the hard drive already uses IRQ5. You cannot use IRQ10 or IRQ12 because the XT cannot use those interrupts.

Configuring a 1784-KTP

The 1784-KTP board allows you to connect directly to the PLC-3 for programming. To configure information for the 1784-KTP board, press [F2] from the online configuration screen until you see this screen:



Select Device	Baud Rate	Bits/ Char	Stop Bits	Parity	Board Address	Save Config
F2	F3	F4	F5	F6	F7	F9

1784-KTP Configuration Screen

You can change the following information for the 1784-KTP board:

[F3] - Baud rate. Set to match your scanner board.

[F4] - Bits/char. Set to match your scanner board.

[F5] - Stop bits. Set to match your scanner board.

[F6] - Parity. Set to match your scanner board.

[F7] - Board address. Set to match the KTP jumper setting (default is ABPINS).

[F9] - Saves your configuration file

Remember, once you've made your choices, press [F9] to save them. The display you save appears everytime you use the system.

You can change the following configuration information about the 1784-KL board:

For DH+ Protocol

[F1] - Network Access toggles between LOCAL and REMOTE. Choose Remote for remote programming.

[F3] - Connection Type toggles between DIRECT and MULTI_DROP.

Select Direct if your terminal is at the end of the DH+ network and requires a termination resistor.

Select multidrop if the terminal is not on the end of the DH+ network and does not require a termination resistor.

[F4] - Terminal Address prompts you to enter a station number on the DH+ network, in octal (0 - 77), for the programming terminal address.

[F5] - PLC Address prompts you to enter a station number, in octal (0 - 77), of the PLC-3 that you want to monitor.

[F7] - Local Bridge prompts you for Data Highway address (0-376) of the 1785-KA on this (local) DH+ network. The system ignores this field if you specify a local network access.

[F8] - Remote Bridge prompts you for the Data Highway address (0-376) of the 1785-KA on the remote DH+ network. The system ignores this field if you specify a local network access.

Remote programming provides access to devices on other DH+ networks that are attached to your DH+ network through a Data Highway network. For more information about remote programming, see "Remote Programming" at the end of this chapter.

Note: If you specify remote programming, bridge address 77 for network 3 is an invalid address.

[F9] - Save Configuration saves the configuration you specified on this screen to your user configuration file. Press [F9] if you want to use this configuration when you start the software.

For BCL

[F3] - Baud rate. Set to match your scanner board.

[F4] - Bits/char. Set to match your scanner board.

[F5] - Stop bits. Set to match your scanner board.

[F6] - Parity. Set to match your scanner board.

[F9] - Saves your configuration file

Configuring a 1784-KT

The 1784-KT provides access for remote programming, as well as quicker communication times than the other boards provide. The 1784-KT also provides access to remote programming. Remote programming provides access to devices on other DH+ networks that are attached to your DH+ network through a Data Highway network. For more information about remote programming, see "Remote Programming" at the end of this chapter.

To configure information for the 1784-KT board, press [F2] - Select Device until you see either the 1784-KT (DH+) or the 1784-KT (BCL) configuration screen.

```

+-----+
| PLC-3 PROGRAMMING SOFTWARE |
+-----+
|                                     |
|       A 6200 Series Software Product       |
|                                     |
| Copyright 1986, 1987, 1988, 1989, Allen-Bradley Company, Inc. |
|                                     |
|  == ONLINE CONFIGURATION ==         |
|                                     |
| F1 Network Access      LOCAL         |
| F2 Current Device      1784-KT (DH+) |
| F3 Connection          MULTI_DROP    |
| F4 Terminal Address    60            |
| F5 PLC Address         14            |
| F6 KT Address          000011        |
| F7 Local Bridge Addr   110           |
| F8 Remote Bridge Addr  376           |
| F9 Save Configuration                                     |
|                                     |
|  == ESC exits/ALT-U aborts changes ==  |
|                                     |
+-----+

This software is

hts, Ohio

Press a function key

Network Select Connect Term  PLC  KT  Local  Remote  Save
Access  Device  Type  Address Address Address Bridge Bridge Config
F1      F2      F3      F4      F5      F6      F7      F8      F9
  
```

A 1784-KT Configuration Screen

You can change the following configuration information for the 1784-KT board:

For DH +

[F1] - Network Access toggles between LOCAL and REMOTE. Choose Remote for remote programming.

[F3] - Connection Type toggles between the two choices, DIRECT and MULTI_DROP.

Select Direct if your terminal is at the end of the DH+ network and requires a termination resistor.

Select Multidrop if the terminal is not on the end of the DH+ network and does not require a termination resistor.

[F4] - Terminal Address prompts you to change the current Data Highway Plus address of your terminal on the DH+ network. If you want to change the address, enter a new one (0 - 77 in octal). Select any valid address as long as no other station on the data highway has that address.

[F5] - PLC Address prompts you to enter the Data Highway Plus address, in octal (0 - 77), of the PLC-3 that you want to monitor. This address corresponds to the switch settings in the 1775-S5 or the 1775-SR5. No two stations on Data Highway Plus can have the same address.

[F6] - 1784-KT Address prompts you to enter the bit address of the KT board located in the programming terminal.

The address corresponds to the KT switch settings, where the left-most bit corresponds to switch 0 and the right-most bit corresponds to switch 10.

Here is a list of valid addresses:

Memory Address (Hexadecimal)		Network Board Switch Settings						Software Address (Binary)
M	L	A14	A15	A16	A17	A18	A19	
S	S							
B	B							
A000:0000		closed	closed	closed	open	closed	open	000101
A400:0000		open	closed	closed	open	closed	open	100101
A800:0000		closed	open	closed	open	closed	open	010101
AC00:0000		open	open	closed	open	closed	open	110101
B400:0000		open	closed	open	open	closed	open	101101
B800:0000		closed	open	open	open	closed	open	011101
1 C000:0000		closed	closed	closed	closed	open	open	000011
2 C400:0000		open	closed	closed	closed	open	open	100011
2 C800:0000		closed	open	closed	closed	open	open	010011
3 CC00:0000		open	open	closed	closed	open	open	110011
4 D000:0000		closed	closed	open	closed	open	open	001011
2 D400:0000		open	closed	open	closed	open	open	101011
2 D800:0000		closed	open	open	closed	open	open	011011
Where: 1 = Factory-set address 2 = Preferred addresses when readdressing the 1784-KT board 3 = KT board in a Compaq 386 that uses a VGA card 4 = KT board in a computer that uses an EGA card								

[F7] - **Local Bridge** prompts you for Data Highway address (0-376) of the 1785-KA on this (local) DH+ network. The system ignores this field if you specify a local network access.

[F8] - **Remote Bridge** prompts you for the DH address (0-376) of the 1785-KA on the remote DH+ network. The system ignores this field if you specify a local network access.

Remote programming provides access to devices on other DH+ networks that are attached to your DH+ network through a Data Highway network. For more information about remote programming, see "Remote Programming" at the end of this chapter.

Note: If you specify remote programming, bridge address 77 for network 3 is an invalid address (377 is not a valid DH address).

[F9] - **Save Configuration** saves the configuration you specified on this screen to your user configuration file. Press [F9] if you want to use this configuration when you start the software.

For BCL

[F3] - Baud rate. Set to match your scanner board.

[F4] - Bits/char. Set to match your scanner board.

[F5] - Stop bits. Set to match your scanner board.

[F6] - Parity. Set to match your scanner board.

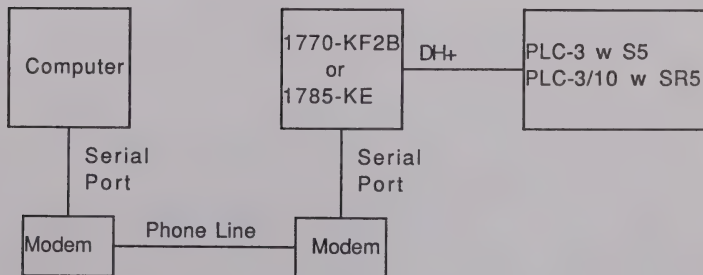
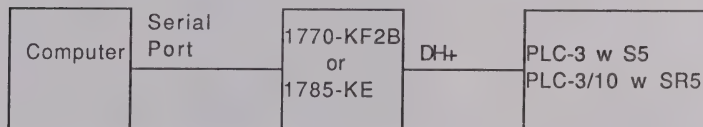
[F7] - Board address. Set to match the KT jumper setting (default is ABPINS).

[F9] - Saves your configuration file

Using a Serial Port

You can have a serial port (COM1 or COM2) using either an internal or external modem, connected to the terminal, and one of the following:

- . A 1770-KF2, Series B Communication Interface Module, which is a desk top unit
- . A 1785-KE Communication Interface Module, which resides in a 1771 I/O rack



Hardware configurations for each of the terminals that PLC-3 supports, their associated peripheral equipment, and cable pinouts are in Appendix C and D. Appendix D also shows valid switch settings for a 1770-KF2 or 1785-KE communication interface module.

Note: If you are using the serial port on a T45 or IBM XT, do not set the baud rate to 19200. Also, in 1770-KF2 and 1785-KE modules, set switch 4 in switch group 6 to ON.

The communication driver is interrupt driven, so the serial port must support hardware interrupts. On most machines, COM1 and COM2 support these interrupts.

To configure a serial port, press [F2] - Select Device until the serial configuration screen appears.

PLC-3 PROGRAMMING SOFTWARE

A 6200 Series Software Product

Copyright © 1991 Rockwell Automation Company, Inc.

This software is a registered trademark of Rockwell Automation Company, Inc.

ONLINE CONFIGURATION

F1 Port COM1
F2 Current Device Serial to DH+
F3 Baud Rate 2400
F4 Device Address 60
F5 PLC Address 14
F6 Parity NONE
F7 Duplex FULL
F8 Error Check CRC
F9 Save Configuration
F10 Modem Setup

ESC exits/ALT-U aborts changes

Press a function key

Port	Select Device	Baud Rate	Term Address	PLC Address	Parity	Duplex	Error Check	Save Config	Modem Setup
F1	F2	F3	F4	F5	F6	F7	F8	F9	F10

Serial Configuration Screen

You can change the following configuration information for a serial port:

[F1] - Port toggles between COM1 and COM2.

[F3] - Baud Rate toggles through 1200, 2400, 4800, 9600, and 19200 baud rates. The default is 2400.

[F4] - **Device Address** lets you specify the address (0-77) the terminal you are using. This is the DH+ station number of the module for 1770-KF2B or 1785-KE.

[F5] - **PLC Address** lets you specify the address (0-77) of the processor to which you want to attach.

[F6] - **Parity** toggles between Even, Odd and None. Set to match your scanner board.

[F7] - **Duplex** toggles between Full and Half. If you choose Full, the software automatically changes its communication configuration parameters to match the setting in the communication module, regardless of what is displayed on the Online Configuration screen.

If you choose Half, make sure that the device address matches the DIP switch settings in the Communication Interface Module (1770-KF2B or 1785-KE).

[F8] - **Error Check** toggles between Block Check Character (BCC) and Cyclic Redundancy Check (CRC) error checking procedures. Set to match the Communication Interface Module (1770-KF2B or 1785-KE).

[F9] - **Save Configuration** saves the configuration you specified on this screen to your user configuration file. Press [F9] if you want to use this configuration when you start the software.

[F10] - **Modem Setup** lets you specify a modem initialization string.

Choosing Communication Settings

The DIP switches on the communication interface module on the DH+ dictate the configuration settings that you specify on the serial configuration screen. If you change the DIP switch settings, you also have to change the settings on the serial configurations screen.

If the screen configuration settings and the switch settings do not match, the software tries all combinations of settings until it finds the correct settings.

Note: Certain configurations (half-duplex, 1200 baud) can take up to 6 minutes to "Load Communication Driver". Therefore, the module DIP switch settings should match the software configuration. The software does not support 300 and 600 baud communication, so make sure that the module is not configured for either of these baud rates.

Using a Modem

To configure a modem, do the following:

- 1. Start on the serial configuration screen.
- 2. Change the configuration information.
- 3. Press [F10] - Modem Setup.

The system displays the Modem Configuration screen.

From this screen, you specify the communication information you need for the modem.

PLC-3 PROGRAMMING SOFTWARE		
A 6200 Series Software Product		
Copyright	ONLINE CONFIGURATION	
	F1 Port	COM1
	F2 Current Device	Serial to DH+
	F3 Baud Rate	2400
	F4 Device Address	60
	F5 PLC Address	14
	F6 Parity	NONE
	MODEM CONFIGURATION	
	F7 Use Modem	No
	F8 Modem String	[]
ESC exits/ALT-U aborts changes		

Press a function key

Use Modem F7	Modem String F8
--------------------	-----------------------

Modem Configuration Screen

- 4. Press [F7] - Use Modem so the field says "yes."

5. Press [F8] - Modem String.

A window appears asking you to enter a text or numeric initialization string.

PLC-3 PROGRAMMING SOFTWARE			
A 6200 Series Software Product			
Copyright	ONLINE CONFIGURATION		Company, Inc.
This software is	F1 Port	COM1	
	F2 Current Device	Serial to DH+	
	F3 Baud Rate	2400	
	F4 Device Address	60	
	F5 PLC Address	14	
	F6 Parity	NONE	hts, Ohio
MODEM CONFIGURATION			
MODEM INITIALIZATION STRING			[INS]
ESC exits/ALT-J aborts changes			

Enter text or numeric. (For a single numeric value such as 128, enter decimal as \128, hex as \x80, or octal as \o200).

Window for the Modem Initialization String

The prompt on this screen indicates that you can enter decimal, hexadecimal, and octal configurations for the modem as long as you use the appropriate prefix for the modem information. The prefixes are:

Prefix:	Format:
\d or \d or \D	decimal
\x or \h or \H	hexadecimal
\o or \O	octal

6. Type the modem initialization string.

The modem initialization string lets you specify special configuration characteristics, such as dial tone or pulse delays. See your modem documentation for additional information.

You can mix decimal, hexadecimal, and octal information in the initialization string as long as you use the prefix for the beginning of each format.

The initialization string can only be 40 characters long, not including any prefixes that you use.

Here is an example of an initialization string for a Hayes-compatible modem:

```
ATDT1,216,6465000\x0D
```

Where:

AT gets the modem's attention

DT specifies tone dialing.

1,216,6465000 is a sample phone number

\x0D is an escape sequence required for ending and sending the string. The **0D** is the hexadecimal ASCII code for a carriage return. The **x** indicates hexadecimal.

The same string in octal is as follows:

```
ATDT1,216,6465000\o15 (The o indicates octal)
```

Note: When you exit Online Programming/Documentation or WHO functions, the software shuts off the modem with a high-to-low transition of DTR. Configure your modem to recognize this signal or the modem will remain connected to the phone line.

Modem Considerations for the T45

The T45 has a modem card option. When the card is inserted, it takes the place of the COM1 port. To turn the modem off and turn the COM1 port on, do the following:

1. Start at the DOS prompt.
2. Type:

```
mode COM1:off,int
```
3. Press [ENTER].
4. Type:

```
mode COM1:on
```
5. Press [ENTER]

Now the software can use the COM1 port for printing and for serial communications.

To turn the modem back on, do the following:

1. Start at the DOS prompt.
2. Type:

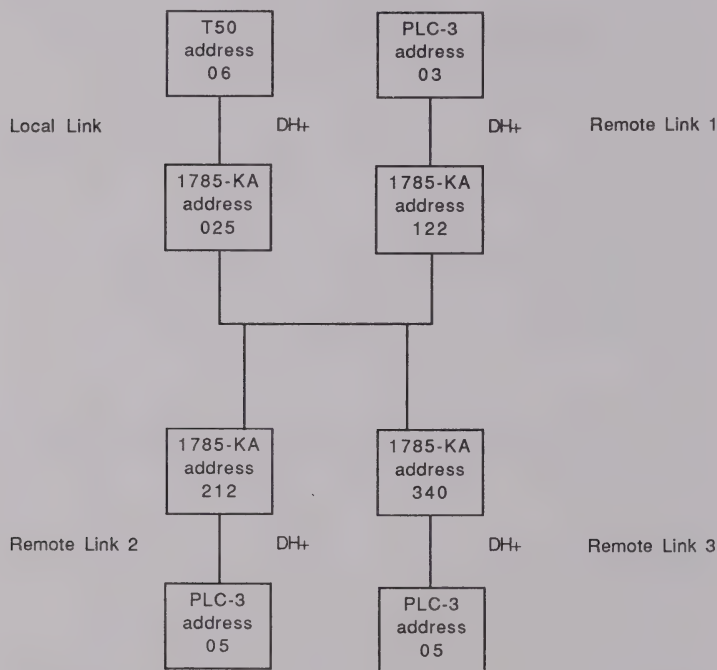
`mode COM1:off`
3. Press [ENTER].
4. Type:

`mode COM1:on,int`
5. Press [ENTER].

Remote Programming

The remote programming configurations available with the 1784-KTK1 and 1784-KT boards let you communicate with a processor on another DH+ network that is attached to your DH+ network through a Data Highway network. The following diagram shows a remote programming example:

NOTE: The 1775-S4A and 1775-S5 (Series A Revision C) modules **do not** support remote programming. However, a future revision of the S5 module will support remote programming (the S4A module will not support remote programming because it does not reside on the Data Highway Plus).



Remote Programming Example

The following rules apply when you set up remote programming:

1. The PLC-3 processor on one DH+ network and a PLC-3 processor on another DH+ network can have the same address.
2. Address 77 octal is illegal on link 3 shown above. Such an address translates to 0xFF, which does not exist on a Data Highway network.
3. The programming terminal can be on any link.

This saves the configuration characteristics you specified on this screen only. If you make changes on other configuration screens, you must save the configuration on those screens if you want the configurations saved to your user configuration file.

After you press [F9], the configuration information remains the same each time you start the software.

If you want to change the configuration information for this editing session only, press [ENTER] or [ESC] after you change the appropriate information. These changes remain until you exit the software.

You can perform the following tasks from the Offline Configuration Screen:

Key:	Function:
[F1] - Offline Programming/ Documentation	Attaches to the selected file on the directory window.
[F3] - Select File	Selects the file the cursor is on as the processor file.
[F6] - Create File	Creates a new processor file.
[F7] - Define Directory	Lets you define where you want to store processor memory files, comments and symbols files, documentation reports, exported comments and symbols files, and user configuration files.
[F9] - Save Configuration	Saves the configuration options you specified.
[F10] - F1 Convert Utility	Converts programs from .ACH format to a logical context (Refer to the F1 Convert Utility section in Chapter 2).

Selecting a Processor File

To select a processor memory file from the Offline Configuration screen, do the following:

1. Move the cursor to the processor you want to make current.

To search for a processor name, type the full or partial name of the processor and press [ENTER]. The system moves the cursor to the best fit in the directory.

You can also use [HOME], [END], [PageUp], [PageDown], the up arrow key, and the down arrow key to choose a processor name.

If you specify a processor that does not exist, the system prompts you to create that processor. See the next section "Creating a Processor File" for more information.

2. Press [F3] - Select File.

The processor name appears in the Offline Processor File window.

3. Press [F1] - Offline Programming/Documentation.

The system displays the program directory for the processor you specified.

Creating a Processor File

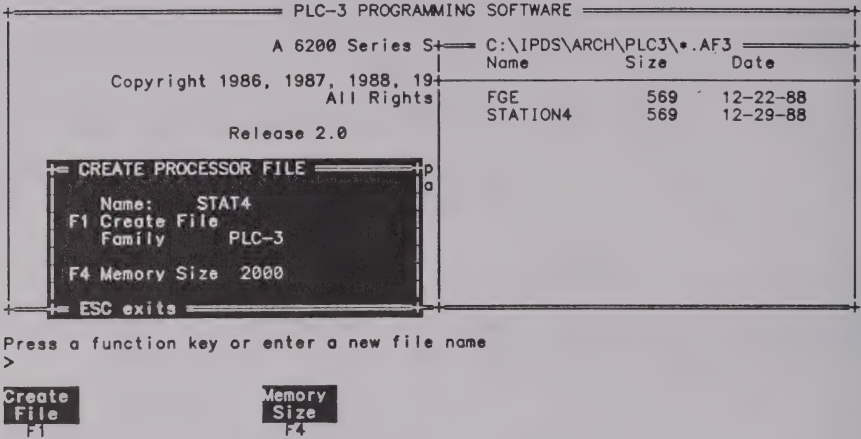
To create a processor file from the Offline Configuration screen, do the following:

1. Start on the Offline Configuration screen.
2. Do one of the following:
 - . Press [F6] - Create File
 - . Type the name of a processor memory file that does not exist and press [ENTER].

If you specify a processor memory file that does not exist, the system asks whether to create the file or not. Type one of the following:

- . [Y] [ENTER] for yes
- . [N] [ENTER] or [ESC] to exit without creating the processor memory file
- . Either the [F8] - Yes or [F10] - No function key

After you press [F6] or specify a processor memory file that does not exist, the system displays the Create Processor screen.



Create Processor Screen

- 3. Specify the characteristics for the processor file so that the configuration matches the target processor when you use online features. The available characteristics are described below.
- 4. Press [F1] - Create File.

The system creates the file you specified.
- 5. Press [F3] - Select File to attach to the file so you can create the program files for the processor file.

You can configure the following characteristics for the processor file:

Key:	Function:
[F1] - Create File	Lets you create a processor using the current processor name.
[F4] - Memory Size	Lets you select memory size in 1K increments.

Chapter Objectives

In this chapter, you will read about processor functions you can perform. These are:

- [F1] Change Mode
- [F4] Change Name
- [F6] LIST
- [F6] Create Context

General Description

When you press [F1] - Online Prg/Doc at the top menu, the second menu appears.

PLC-3 PROGRAMMING SOFTWARE					
[ONLINE]					
RUNNING CONTEXT		DATA TABLE	PROGRAM	MESSAGE	TOTAL
CONTEXT	NAME				
1	STATION3	11299	5383	0	16682

Press a key .

PROGRAM			memory UNPROTECTED			Direct Connect	
PROCSSR	SAVE	RETURN	CREATE	DIR	MONITOR	NEXT	PREV
FUNCTNS	RESTORE	TO MENU	REPORTS	DISPLAY	PROGRAM	PAGE	PAGE
F1	F2	F3	F6	F7	F8	F9	F10

Press [F1] Processor Functions to get the following menu:

PLC-3 PROGRAMMING SOFTWARE						[ONLINE]
RUNNING CONTEXT	CONTEXT NAME	DATA TABLE	PROGRAM	MESSAGE	TOTAL	
1	STATION3	1422	187	0	1610	

Press a key .

PROGRAM	memory UNPROTECTED					Direct Connect
CHANGE	NAME	LIST	CREATE	DIR	MONITOR	NEXT
MODE	NAME	CONTEXT	DISPLAY	PROGRAM	PAGE	PREV
F1	F4	F5	F6	F7	F8	F9
						F10

At this display you can:

- . change the processor operating mode (F1)
- . change the program name (F4)
- . use the LIST function
- . create a new context (F6)
- . view Directory Display (F7)
- . monitor or edit a program (F8)
- . view the next page of programs (F9)
- . view the previous page of programs (F10)
- . move through the list of programs with the up and down arrow, [HOME], [END] cursor keys
- . enter a number and press [ENTER] to move the cursor to an existing program
- . search for a context number or name

Change Mode [F1]

Pressing [F1] - Change Mode changes the display to show:

- [F1] - Program Mode
- [F2] - Test Mode
- [F3] - Run Mode.

Important: The processor must have the "remote enable" resource. You get the "remote enable" resource by running LIST through the front panel. Refer to to chapter 8, Changing Processor Mode, for instructions on how to change modes.

Change Name [F4]

You can change the existing program name or create a new program name. All files you create (comment and symbol files and documentation reports) while in this program take on the program name. When you change the program name, you are asked for confirmation of the name change if the name already exists. If you change the program name, you can change the associated file names with the Rename or Copy options of File Options.

The name "NONAME" appears the first time you use the software or when you clear processor memory. You must change this name before you can edit or document a program.

1. Move the cursor to the program that you want to name.
2. Press [F4] - Change Name. Type the program name and press [ENTER]. The program directory name can be composed of up to 8 of the following characters:
 - . letters A - Z (both upper and lower case)
 - . numbers 0 - 9
 - . underscore character _

You must name each context listed in the program directory before you can monitor, edit or document that context.

The name you enter is stored in the processor at extended address E3.X.14.0.0.0.

|
|context 1-15

LIST [F5]

LIST allows you to configure your PLC-3 system. While you are in LIST, the status line does not display processor status information. In LIST, you use the number keys instead of the function keys.

LIST appears the same in the software as it does when you use it with a T4 Industrial Terminal. The only difference is the T4 scrolls automatically through the system list information. The software presents the information through a series of screens. You select the number of the item that you want to examine. Refer to appendix E for LIST menus for each PLC-3 module.

To get to LIST from the top menu, select:

- [F1] - Online Program/Documentation
- [F1] - Processor Functions
- [F5] - LIST

The following display appears:

PLC-3 PROGRAMMING SOFTWARE		[ONLINE]
LIST CONFIGURATION MENU		
SYSTEM-MODE 1 TEST MONITOR 2 RUN MONITOR 3*PROGRAM LOAD 4*REMOTE ENABLE 5 SYSTEM STATUS 6 MODULE STATUS ENTER NEXT >		

Enter next.

PROGRAM MORE MENU F1	memory UNPROTECTED	Direct Connect EXIT LIST F10
-------------------------------	--------------------	---------------------------------------

Here are some functions you can do with LIST.

Clear Memory

- [F5] LIST
- [5] System Status
- [5] Memory
- [1] Clear All

Set Date

- [5] System Status
- [3] Clock
- [1] Date

Set Channel Timeouts

- [F5] LIST
- [6] Module Status
- [] Select scanner you're using
- [1] Communications channel
- [] Select channel you're using
- [6] Channel timeout

Set Time

- [5] System Status
- [3] Clock
- [2] Time

**Create Context
[F6]**

Select [F6] Create Context when you want to create a new context. You are asked to enter the context number.

**Directory Display
[F7]**

Select [F7] Directory Display to see a list of programs (contexts) that reside in your PLC-3 processor.

**Monitor Program
[F8]**

Move the cursor to the program file that you want to edit or monitor and press [F8] Monitor Program, or you can enter the context name and press [ENTER]. If the context exists, the cursor is placed on the name. You see rungs displayed and you are now monitoring your ladder program. True logic is shown with intensification when the processor is in test or run mode. Now you can edit or document your program.

We tell you how to edit and monitor your programs in the remaining chapters of this manual.

Chapter Objectives In this chapter you will read about the monitor program display and where to find specific information about editing and monitoring a ladder program.

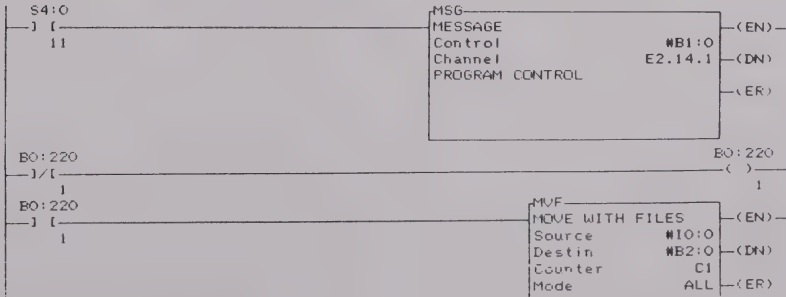
Getting Started You begin editing or monitoring a ladder program by selecting [F8] Monitor Program from the second menu. You are asked to name your program if you have not done so.

PLC-3 PROGRAMMING SOFTWARE					
[ONLINE]					
PROGRAM DIRECTORY	CONTEXT	NAME	DATA TABLE	PROGRAM	MESSAGE
	1	STATION3	1422	187	0
					1610

Press a key .

PROGRAM	memory UNPROTECTED				Direct Connect			
CHANGE	CHANGE	LIST	CREATE	DIR	MONITOR	NEXT	PREV	
MODE	NAME		CONTEXT	DISPLAY	PROGRAM	PAGE	PAGE	
F1	F4	F5	F6	F7	F8	F9	F10	

After you press [F8], you see the rungs in your ladder program.



Press a function key.

(Rung M:0)	no edits				Direct Connect			
PROGRAM	no forces		DOCUMENT	SEARCH	GENERAL	DATA	FORCE	EDIT
CHANGE	CONFIG	RETURN			UTILITY	MONITOR		
MODE	DISPLAY	TO MENU						
F1	F2	F3	F5	F6	F7	F8	F9	F10

You are now in the ladder editor. Rungs of the program (or the end-of-file rung, if this is a new program) appear at the top of the display. Several soft function key designations appear at the bottom of the display. Above the function keys is the status line. Above the status line is the input line and above that is the prompt line.

The following chapters explain each of the function keys and the tasks that you can perform.

If you want to:	Refer to:
edit a ladder program	chapter 6, Ladder Editor
change the way rungs are displayed on the screen	chapter 7, Configuring the Ladder Display
change the processor mode	chapter 8, Changing Processor Operating Mode
search for an instruction or symbol in ladder program	chapter 9, Searching for Addresses and Rungs
force I/O points	chapter 10, Forcing Functions
monitor a data table online	chapter 11, Data Monitor
check processor status create a contact histogram display the memory map	chapter 12, General Utilities and Processor Status
document a program	chapter 15, Program Documentation
get reports	chapter 16, Generate and Print Reports

Chapter Objectives

In this chapter you will read about:

- . rung editing
 - . instruction editing
 - . branch editing
 - . instruction addressing
-

Introduction to the Ladder Editor

You use the ladder editor menu display to:

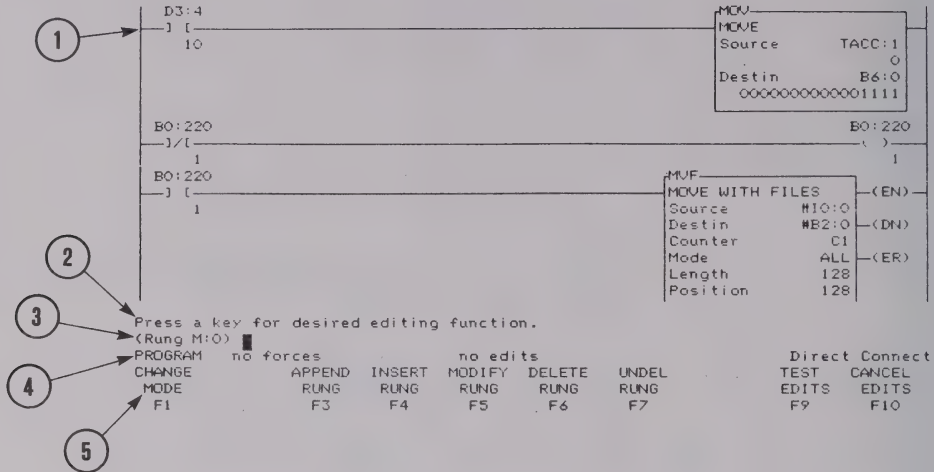
- . change the processor operating mode
- . create, edit and monitor the ladder program

IMPORTANT: Before you use the Ladder Editor, you need to set channel timeouts to 0 on the channel that you are communicating through.

While editing a program with the software, the edit resource is not available (for that context) to any other terminal until you assemble the edits and return to the Monitor Program display. The edit resource is available with a T4 after you assemble the edits.

When you press [F10] - Edit at the monitor program menu, the first display you see is the "Ladder Editor".

Ladder Editor Display



The ladder editor display has five sections:

- 1. Program Area** - The area of the display that shows your ladder diagram. For newly created files, you will see an "End of File" marker when the ladder diagram display first appears.
 - When the processor is executing the program (RUN mode), instructions that are logically true (active) are intensified (appear brighter) on the rung display.
 - When forces are enabled, the word "ON" or "OFF" displayed next to the bit is intensified.
- 2. Prompt Line** - The prompt line appears on the display below the program area when a specific action or response is required. The information you enter in response to a prompt appears below the prompt line.

3. **Input Line** - This line displays the information that you enter. You can use these keys to edit data on this line:

[CTRL] [A] - toggles between insert and overstrike mode
[CTRL] [B] - move cursor to the beginning of the line
[CTRL] [D] - move cursor 1 character to the left
[CTRL] [E] - move cursor to the end of the line
[CTRL] [F] - move cursor 1 character to the right
[CTRL] [H] - delete 1 character to the left
[CTRL] [J] - delete from the cursor to end of the line
[CTRL] [M] - same as [ENTER]
[CTRL] [R] - recall last command
[CTRL] [U] - delete from line beginning to left of cursor
[CTRL] [X] - delete line

4. **Status Line** - The status line displays information concerning processor mode, state of forces, PLC-3 station number, editing mode (insert, modify, append), instruction searches and data formats. A brief descriptions of status line messages is included at the end of this chapter.
5. **Function Key Menu** - You use the function key menu to select options that appear at the bottom of the display.

Keys You Use in the Ladder Editor

The eight cursor keys are:

- . left, right, up, and down arrow keys
- . [CONTROL] [-->] (to right power rail of current rung)
- . [CONTROL] [<--] (to left power rail of current rung)
- . [CONTROL] [↓] (to first instruction of next rung)
- . [CONTROL] [↑] (to first instruction of previous rung)

You use these keys to move:

- . from rung to rung
- . among branches on a rung
- . from instruction to instruction
- . from operand to operand within an instruction

You can also use these keys:

[HOME]	moves the cursor to the top of the program
[END]	moves the cursor to the bottom of the program
[ENTER]	terminates data entry when required
[ESCAPE]	(cancel) returns the program to the previous menu level, in most cases
[ALT] [C]	displays the change processor mode screen
[ALT] [E]	displays the configure display screen
[ALT] [S]	displays the search screen
[ALT] [T]	displays the program documentation screen

There are some limitations on cursor keys. When you select:

- [F3] - append rung
- [F4] - insert rung
- [F5] - modify rung

you can edit only one rung at a time.

The First Step in Ladder Editing Function

When you enter the ladder editor by pressing [F10]
- Edit, the ladder editor appears:

Press a key for desired editing function.
(Rung M:0) ☐ no forces no edits

CHANGE	APPEND	INSERT	MODIFY	DELETE	UNDEL	Direct Connect
MODE	RUNG	RUNG	RUNG	RUNG	RUNG	TEST CANCEL
F1	F3	F4	F5	F6	F7	EDITS EDITS
						F9 F10

D3:4
 J [10
 BO:220
 J / [1
 BO:220
 J [1

MOV
 MOVE
 Source TACC:1
 0
 Destin B6:0
 0000000000001111

BO:220
 () 1

MOV
 MOVE WITH FILES
 Source #10:0
 Destin #B2:0 (DN)
 Counter C1
 Mode ALL (ER)
 Length 128
 Position 128

Here is a brief description of the function keys that appear at the ladder editor display.

Function Key	Action
[F1] - Change Mode	Changes the processor operating mode.
[F3] - Append Rung	Inserts a rung below the current rung* in the ladder program.
[F4] - Insert Rung	Inserts a new rung above the current rung* in the ladder program.
[F5] - Modify Rung	Allows you to edit the current rung*.
[F6] - Delete Rung	Deletes the current rung* from the ladder program above the current rung*.
[F7] - Undel Rung	Re-inserts the last deleted rung in the ladder program.
[F9] - Test Edits	The processor tests the edit zones in the program and the test edits screen is displayed. See the section on I/R/D editing for more information.
[F10] - Cancel Edits	Cancels all edits to a program.

* The current rung is the rung that the cursor is on. The current rung number is displayed on the input line.

I/R/D Editing

While in the ladder editor display, you can insert, delete, undelete, or append a branch or rung in your ladder diagram using the keys listed in the previous table.

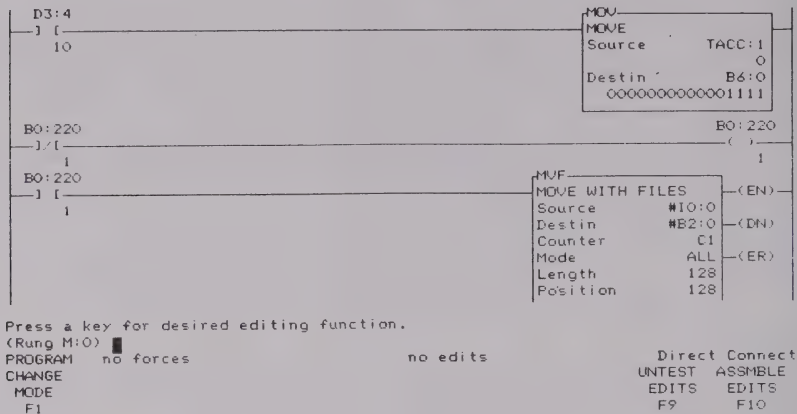
When in run or test mode, I/R/D (insert/replace/delete) editing allows you to edit a program and view the changes before making the edits a permanent part of the program. When you insert, modify (replace), or delete a rung, that rung (or group of rungs) is "tagged" with the appropriate I, R, or D marker on the power rails, indicating that this portion of the program is being edited.

The table summarizes I/R/D editing and is true for run, test or program mode.

If power rail shows	If you press [F9] Test Edits [F1] Yes to confirm [F10] Assemble Edits [F1] Yes to confirm	If you press [F10] Cancel Edits [F1] Yes to confirm
I	Rung becomes part of the program.	Rung is deleted.
D	Rung is deleted.	Rung remains in program.
R	Rung is replaced by the I rung above it.	Rung remains in program.

When you are finished editing the program, you can test the changes without making them a permanent part of the program. This is a useful debugging tool because the changes remain marked until you "assemble the edits" into a permanent working program.

For example, if you Press [F9] - Test Edits and [F1] Yes to confirm, you see this display:



From this screen, several possibilities exist:

Processor Editing

Mode:

Action:

edits enabled

normal rungs and rungs marked with I
are executed and rungs marked D or R
are ignored

edits disabled

normal rungs and rungs marked I are ignored and rungs marked D or R are executed

If you press:

Then:

[F9] - Untest Edits

the processor editing mode is changed to "edits disabled" and you are returned to the rung editing display.

[F10] - Assemble Edits

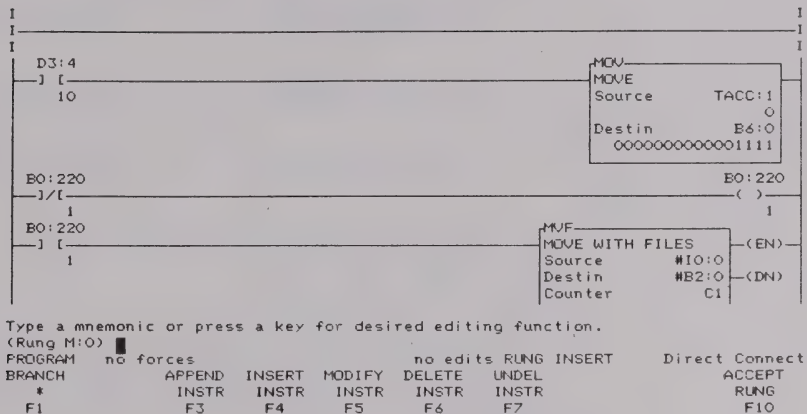
all edits are assembled and become part of the program.

Editing Rungs

To begin working on your program, let's insert a rung.

Press [F4] - Insert Rung, which will add an empty rung before the cursored rung.

Once you do this, the following display appears with a blank rung temporarily inserted at the top of the display:



The function keys that appear at the bottom of the display are for inserting, deleting, and editing instructions and branches.

Function Key

Function

[F1] - Branch

allows you to insert, delete, and edit branches.

[F3] - Append instruction

allows you to insert an instruction on the rung to the right of the cursor.

[F4] - Insert instruction	allows you to insert an instruction on the rung to the left of the cursor.
[F5] - Modify instruction	allows you to modify an instruction on the rung by changing the mnemonic and/or address.
[F6] - Delete instruction	deletes an instruction from the rung.
[F7] - Undelete instruction	re-inserts the last previously deleted instruction on the rung.
[F10] - Accept Rung	saves edits to the rung and returns to the rung edit display.

You can use any of these keys to insert or edit an instruction on the rung.

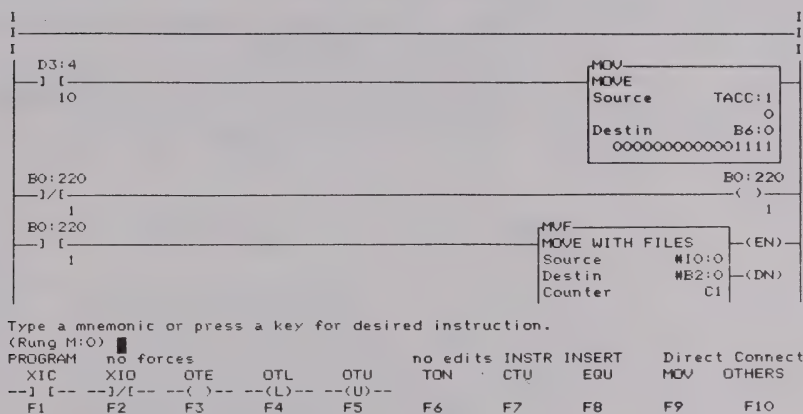
Note: To insert a rung in the subroutine or fault routine sections, you must use the search function to search for any rung, e.g., S0 or F0. Then you can insert a rung. Chapter 9 contains information on searching.

Inserting an Instruction on a Rung

There are several ways to insert an instruction on a rung.

You can:

- type the 3-letter mnemonic and press [ENTER]
- press [F4] - Insert Instruction. [F4] displays a list of mnemonics at the bottom of the screen that you can select.
- select [F10] - Others after pressing [F4].



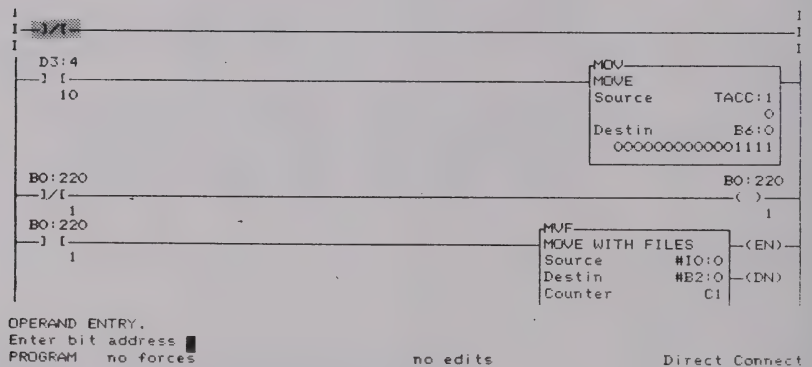
[F10] - Others displays 10 different categories of instructions. When you select one of the categories, the display is updated to show all of the instructions in that category.

You can find a brief description of each instruction (including its three-letter mnemonic) in Appendix A of this manual. For a more detailed discussion of each instruction, see the PLC-3 Family Programming Manual, publication number 1775-6.4.1.

Follow these steps to insert an instruction.

1. Position the cursor on the rung where you want to insert the instruction.
2. Type the three-letter mnemonic or use a function key to enter the instruction.

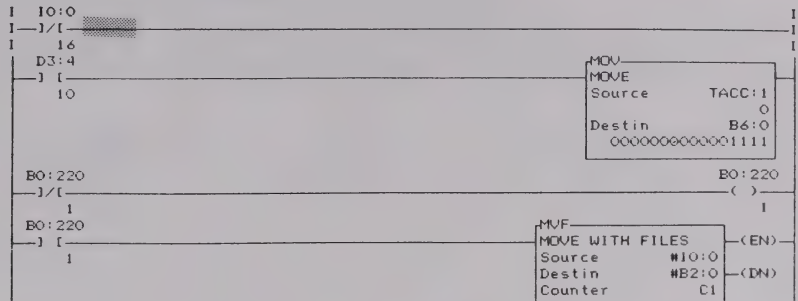
For example, we have entered an XIO instruction and the following display appears:



As you can see, the symbol for the XIO instruction (-)/[-) appears on the rung.

3. Enter the address for the instruction and press [ENTER].

In our example, we have entered the address I0/16, as shown on the next screen.

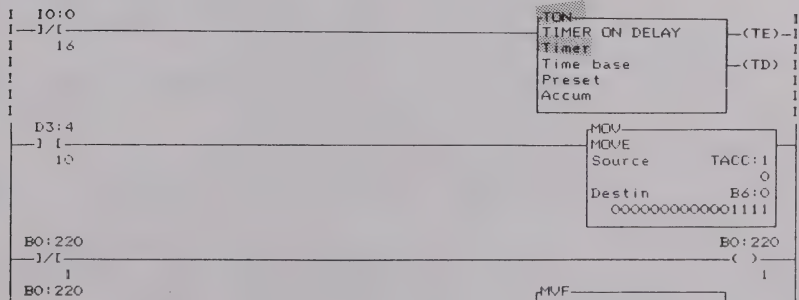


Type a mnemonic or press a key for desired instruction.

(Rung M:0) ☐ no forces

PROGRAM		no edits		INSTR		INSERT		Direct Connect	
XIC	XIO	OPE	OTL	OTU	TON	CTU	EQU	MOV	OTHERS
--]	--]	--]	--(L)	--(U)					
F1	F2	F3	F4	F5	F6	F7	F8	F9	F10

Some instructions require you to enter several addresses or values, such as a Timer-On-Delay instruction. When you enter the 3-letter mnemonic, the instruction block is displayed on the rung and you are prompted to enter the timer address.



OPERAND ENTRY.

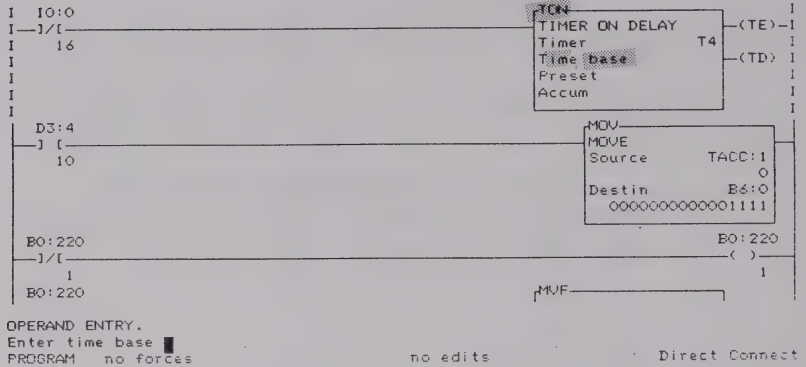
Enter timer address ☐

PROGRAM no forces

no edits

Direct Connect

Enter the address and press [ENTER]. The cursor moves down to the next field and you are prompted to enter the time base. You can use the up and down arrow keys to cursor among the fields to edit data and addresses.



Continue entering all information, pressing [ENTER] after each, then press [ENTER] after you have entered all addresses and values to accept the instruction.

If you want to exit to the rung editing display without saving the new instruction(s) that you entered, press [ESC] and [F1] Yes to confirm.

Now that we have shown you how to enter an instruction on a rung, we will show you how to:

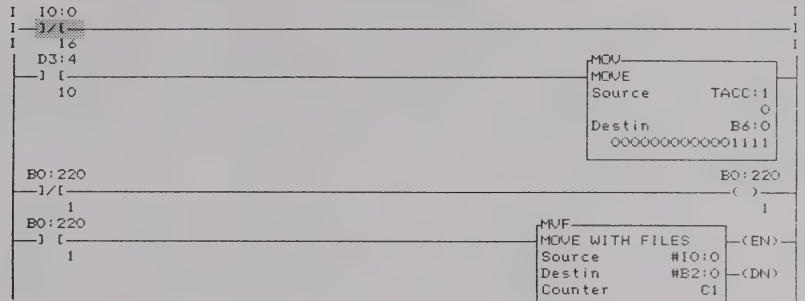
- enter instructions on either side of the XIO we entered in the previous example
- delete an instruction from the rung
- modify the address of an existing instruction

Entering Additional Instructions

You can enter a new instruction to the right of an existing instruction with [F3] - Append Instr or to the left of an existing instruction with [F4] - Insert Instr.

[F3] - Append

1. Position the cursor on the existing instruction. In our example, the cursor is on the XIO instruction.



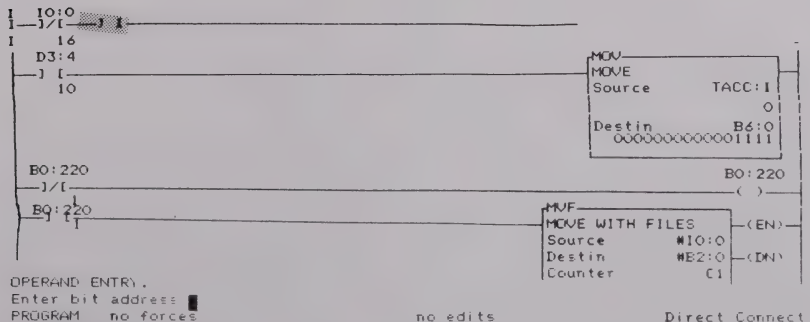
Type a mnemonic or press a key for desired editing function.

(Rung M:0)

PROGRAM	no forces	no edits					RUNG INSERT	Direct Connect
BRANCH		APPEND INSTR	INSERT INSTR	MODIFY INSTR	DELETE INSTR	UNDEL INSTR	ACCEPT RUNG	
F1		F3	F4	F5	F6	F7	F10	

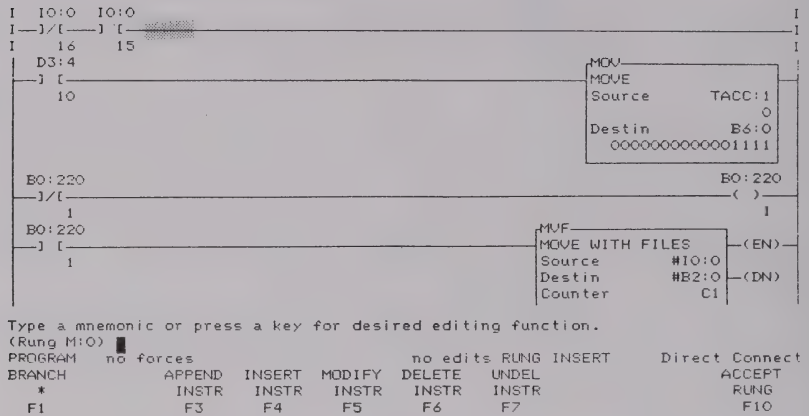
2. Press [F3] - Append Instruction.
3. Type the 3-letter mnemonic for the instruction that you want to append on the rung and press [ENTER] or select the mnemonic with the appropriate function key.

For example, we have entered an XIC instruction and the display is updated as follows:



As you can see, the symbol for the XIC instruction (-) appears on the rung.

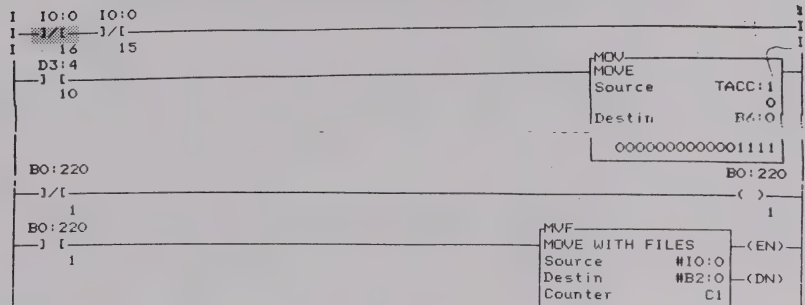
4. Enter the address for the instruction and press [ENTER].



In our example, we have entered the address I0/15.

[F4] - Insert

1. Position the cursor on the rung where you want to insert the instruction. In our example, the cursor is on XIO instruction I0/16.



Type a mnemonic or press a key for desired editing function.

(Rung M:0) █

PROGRAM no forces

BRANCH

*

F1

APPEND

INSTR

F3

INSERT

INSTR

F4

MODIFY

INSTR

F5

DELETE

INSTR

F6

no edits

INSTR

F7

RUNG INSERT

INSTR

F7

Direct Connect

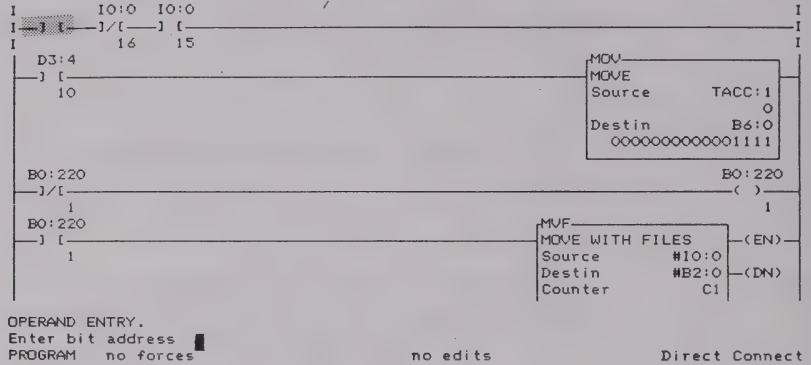
ACCEPT

RUNG

F10

2. Press [F4] - Insert.
3. Type the 3-letter mnemonic for the instruction that you want to insert on the rung and press [ENTER].

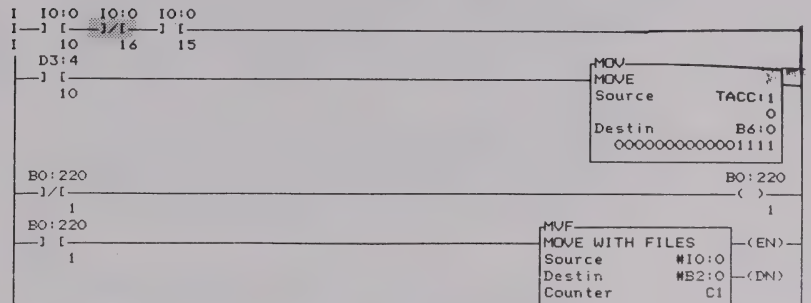
For example, we have entered an XIC instruction and the display is updated as follows:



As you can see, the symbol for the XIC instruction (-) [-] appears on the rung.

4. Enter the address for the instruction and press [ENTER].

In our example, we have entered the address I0/10.



Type a mnemonic or press a key for desired instruction.

(Rung M:0)

PROGRAM no forces XIC OTL OTU no edits INSTR MODIFY Direct Connect
 ---] [---] / [---] () --- (L) --- (U) ---
 F1 F2 F3 F4 F5 F6 F7 F8 F9 F10

Deleting Instructions

You can delete an instruction from the rung with the following steps. We will delete the XIO I0/16 from our example display.

1. Position the cursor on the instruction that you want to delete. In our example this is XIO I0/16

The screenshot shows a ladder editor interface. At the top, there are three input lines labeled I 10:0, I 10:0, and I 10:0. Below them, a rung contains four instructions: D3:4, MOV, BO:220, and MUF. The MOV instruction is expanded to show its details: Source TACC:1, Destin B6:0, and a value 0000000000001111. The MUF instruction is expanded to show its details: Source #10:0, Destin #B2:0, and Counter C1. The instruction I0/16 is highlighted with a cursor.

Type a mnemonic or press a key for desired editing function.

(Rung M:0)		no forces		no edits		RUNG INSERT		Direct Connect	
PROGRAM		APPEND	INSERT	MODIFY	DELETE	UNDEL		ACCEPT	
BRANCH	*	INSTR	INSTR	INSTR	INSTR	INSTR		RUNG	
	F1	F3	F4	F5	F6	F7		F10	

2. Press [F6] - Delete Instruction. The instruction is removed from the rung.

The screenshot shows the same ladder editor interface as before, but the instruction I0/16 has been removed from the rung. The rung now contains only three instructions: D3:4, MOV, and MUF. The MOV and MUF instructions are still expanded to show their details.

Type a mnemonic or press a key for desired editing function.

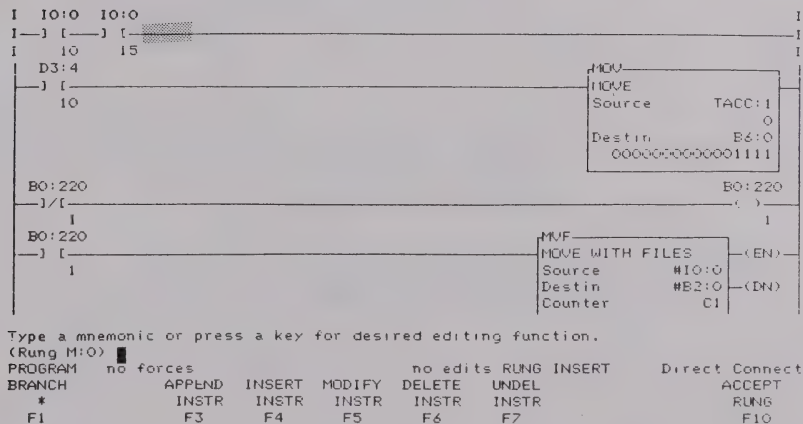
(Rung M:0)		no forces		no edits		RUNG INSERT		Direct Connect	
PROGRAM		APPEND	INSERT	MODIFY	DELETE	UNDEL		ACCEPT	
BRANCH	*	INSTR	INSTR	INSTR	INSTR	INSTR		RUNG	
	F1	F3	F4	F5	F6	F7		F10	

Re-inserting Deleted Instructions

The software contains temporary storage areas called buffers. The instruction buffer allows you to temporarily store the last deleted instruction. The term "last deleted" means that the buffer stores only one instruction at a time.

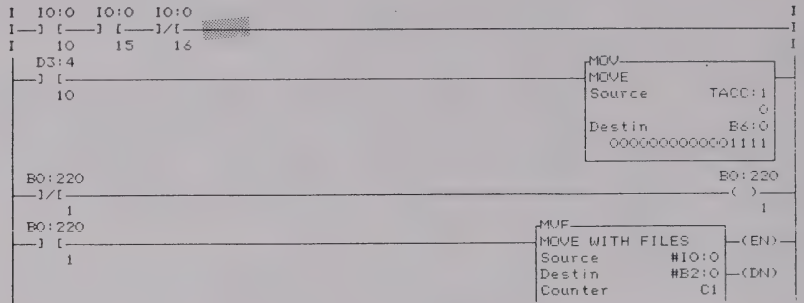
For example, if the buffer contains a previously deleted XIC instruction and you deleted an XIO instruction (as in our previous example), the XIO instruction overwrites the XIC instruction in the buffer. The XIO instruction now becomes the "last deleted" instruction and is the only instruction retained in the buffer.

1. Position the cursor on the rung where you want to insert the previously deleted instruction. For example, we will re-insert the XIO instruction that we deleted in the previous section.



2. Press [F7] - Undelete Instruction.

The instruction is now re-entered on the rung.

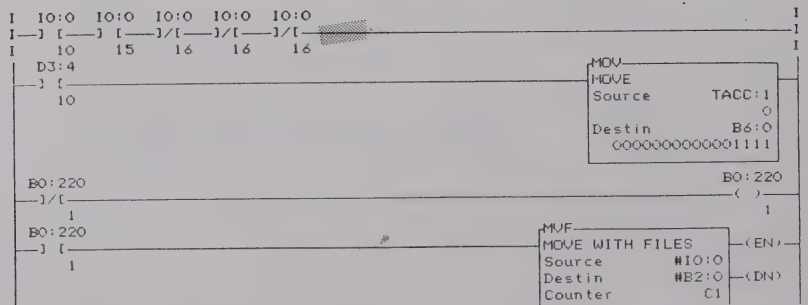


Type a mnemonic or press a key for desired editing function.

(Rung M:0)

PROGRAM	no forces	no edits					RUNG INSERT	Direct Connect
BRANCH		APPEND	INSERT	MODIFY	DELETE	UNDEL		ACCEPT
*		INSTR	INSTR	INSTR	*INSTR	INSTR		RUNG
F1		F3	F4	F5	F6	F7		F10

You can also press this key repeatedly to re-insert deleted instructions as many times as you want. For example, we pressed [F7] two more times. The following display shows the result.



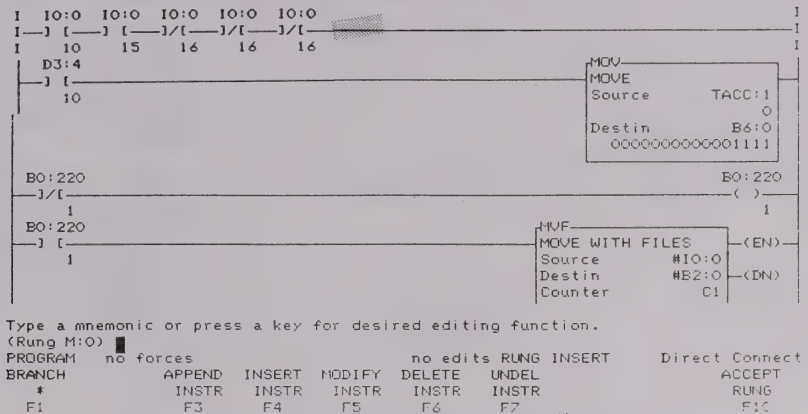
Type a mnemonic or press a key for desired editing function.

(Rung M:0)

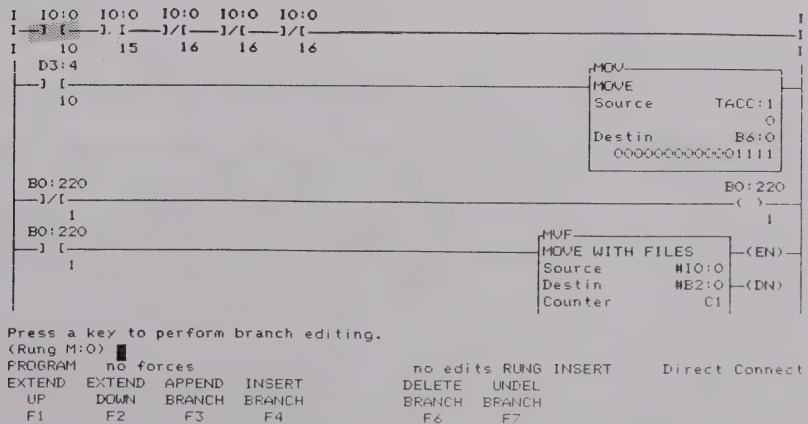
PROGRAM	no forces	no edits					RUNG INSERT	Direct Connect
BRANCH		APPEND	INSERT	MODIFY	DELETE	UNDEL		ACCEPT
*		INSTR	INSTR	INSTR	*INSTR	INSTR		RUNG
F1		F3	F4	F5	F6	F7		F10

Branch Editing

In the previous sections, we showed you how to insert, delete, and edit instructions. Our last example left us with the following display. We will continue using this display to illustrate our examples on branching.



When you enter the branch editing menu by pressing [F1] - Branch, the branch editing menu appears. The PLC-3 processor allows both input and output branches.

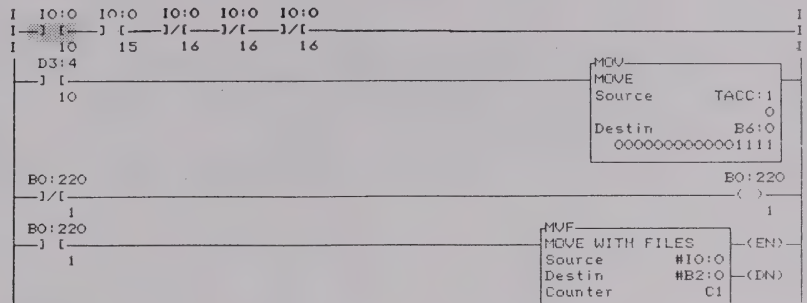


Here is a brief description of the function keys that appear at the bottom of the display.

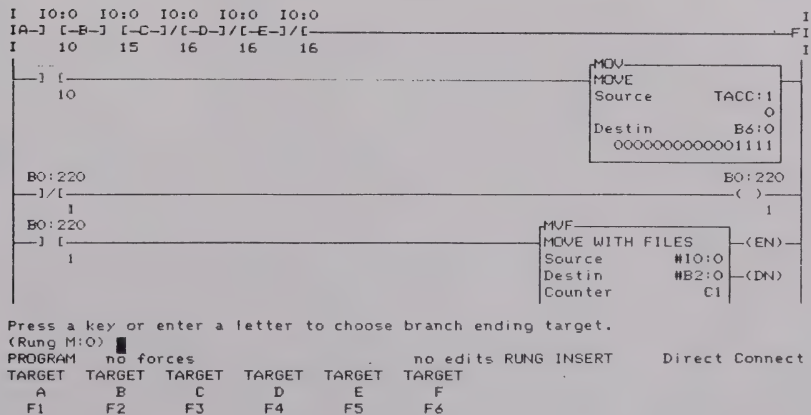
Function Key	Function
[F1] - Extend Up	Extends an existing branch upward. The new branch level shares the same start and end points as the existing branch.
[F2] - Extend Down	Extends an existing branch downward. The new branch level shares the same start and end points as the existing branch.
[F3] - Append Branch	Begins a branch with starting point to the right of the cursor.
[F4] - Insert Branch	Begins a branch with starting point is to the left of the cursor.
[F6] - Delete Branch	Delete the branch that the cursor is on.
[F7] - Undelete Branch	Allows you to re-insert a previously deleted branch. The branch starting point will be to the left of the cursor.

To insert a branch in the rung, follow these steps:

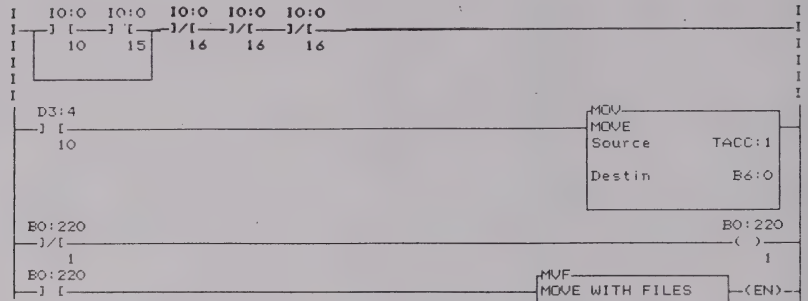
1. Position the cursor on the instruction where the branch is to begin. The branch will begin to the left of the cursor. For example, if you want to insert a branch around the two XIC instructions, place the cursor on the first XIC instruction (I0/10).



2. Press [F4]. The branch target menu appears at the bottom of the display to show the valid branch ending points. To complete our example, we can press [F3] or type [C] [ENTER].



The branch starts to the left of the first XIC instruction and ends to the right of the second XIC instruction.

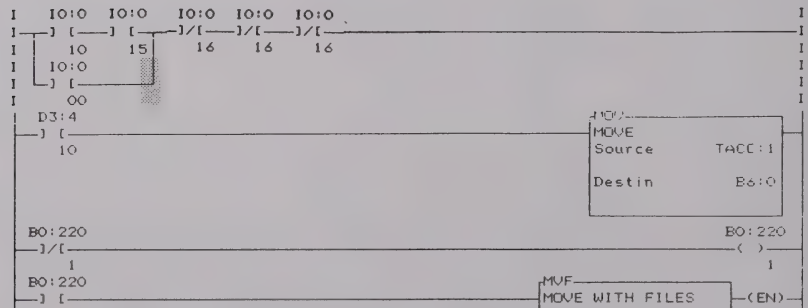


Type a mnemonic or press a key for desired editing function.

(Rung M:0)

PROGRAM	no forces					no edits	RUNG	INSERT	Direct Connect
BRANCH	APPEND	INSERT	MODIFY	DELETE	UNDEL				ACCEPT
*	INSTR	INSTR	INSTR	INSTR	INSTR				RUNG
F1	F3	F4	F5	F6	F7				F10

Insert an instruction on the branch just as you would on a rung. We entered an XIC instruction and gave it the address I0/00.



Type a mnemonic or press a key for desired instruction.

(Rung M:0)

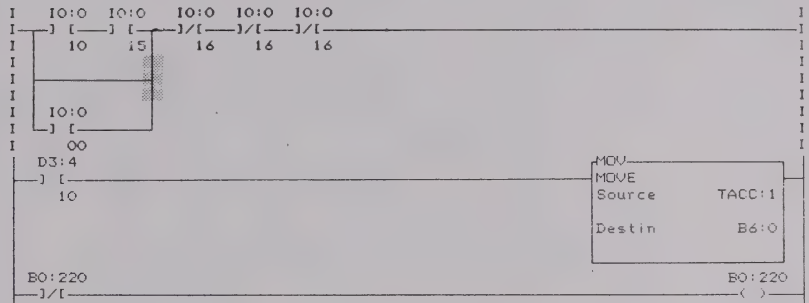
PROGRAM	no forces					no edits	INSTR	INSERT	Direct Connect
XIC	XIO	OTE	OTL	OTU	TON	CTU	EQU	MOV	OTHERS
--[]--	--[/]--	--()--	--(L)--	--(U)--					
F1	F2	F3	F4	F5	F6	F7	F8	F9	F10

Creating Multiple Branch Levels on a Rung

You can create a rung that has a maximum of 16 nested branches that do not share a common branch end. There are two methods to do this.

Extending a Branch

A new, empty branch is extended either above ([F1] - Extend Up) or below ([F2] - Extend Down) an existing branch. The new branch shares the start and end points of the existing branch. Here we show an example of a branch extended up



Type a mnemonic or press a key for desired editing function.
 (Rung M:0) ☐ no forces
 PROGRAM INSTR INSERT MODIFY DELETE UNDEL RUNG INSERT Direct Connect
 BRANCH * INSTR INSTR INSTR INSTR INSTR INSTR ACCEPT
 F1 F3 F4 F5 F6 F7 F10

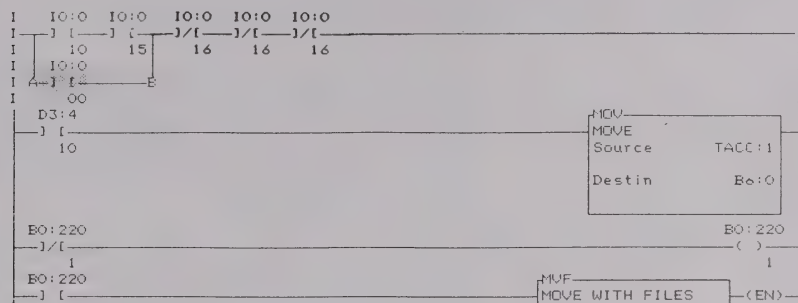
Figure 1-10 illustrates the ladder logic for the MOV instruction. The logic consists of a single rung with a normally open contact labeled 'D3:4' containing the value '10'. This contact is connected to a coil labeled 'MOV'. The coil has two outputs: 'Source TACC:1' and 'Destin B6:0'. Below the coil, there is a label 'B0:220' and a value '1/1'.

PROGRAM	no forces	no edits RUNG INSERT				Direct Connect
BRANCH	APPEND	INSERT	MODIFY	DELETE	UNDEL	ACCEPT
*	INSTR	INSTR	INSTR	INSTR	INSTR	RUNG
F1	F3	F4	F5	F6	F7	F10

Appending or Inserting a Branch

Follow these steps to append a branch.

1. Position the cursor on the instruction where the branch is to begin. The branch will begin to the right of the cursor. For example, if you want to insert a branch to the right of the XIC instruction on the existing branch, place the cursor on the XIC instruction (I0/00).
2. Press [F1] - Branch, then [F3] - Append Branch. The branch target menu appears at the bottom of the display to show the valid branch ending points. This display is shown next.



Press a key or enter a letter to choose branch ending target.

(Rung M:O)

PROGRAM no forces

no edits RUNG INSERT

Direct Connect

TARGET TARGET

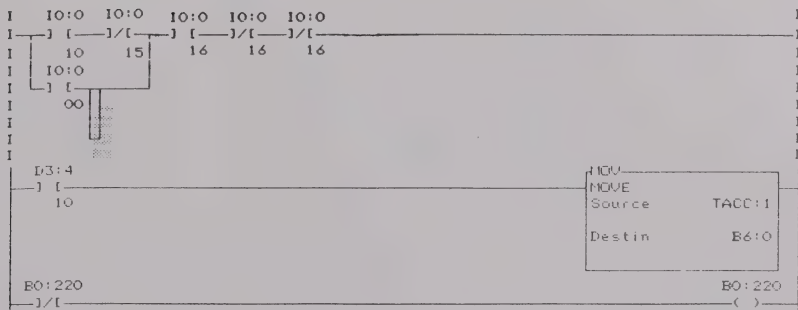
A

E

F1

F2

Press [F2] - Target B to get the display below. The branch starts and ends to the right of the XIC instruction.



Type a mnemonic or press a key for desired editing function.

(Rung M:O) ■

PROGRAM no forces

/ no edits RUNG INSERT

Direct Connect

BRANCH

APPEND

INSERT

MODIFY

DELETE

UNDEL

ACCEPT

★

INSTR

INSTR

INSTR

INSTR

INSTR

RUNG

F1

F3

F4

FS

F

F2

F10

1

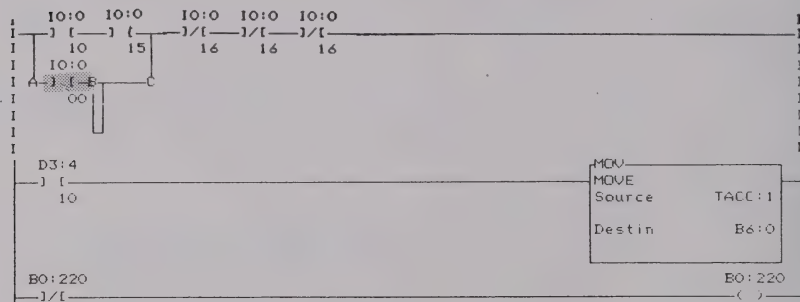
1

1130

Inserting a branch starts a new, empty branch to the left of the cursor.

Follow these steps to insert a branch.

1. Position the cursor on the instruction where the branch is to begin. The branch will begin to the left of the cursor. For example, if you want to insert a branch to the left of the XIC instruction on the existing branch, place the cursor on the XIC instruction (I0/00).
2. Press [F1] - Branch, then [F4] - Insert Branch. The branch target menu appears at the bottom of the display to show the valid branch ending points. This display is shown next.



Press a key or enter a letter to choose branch ending target.

(Rung M:0)

PROGRAM no forces

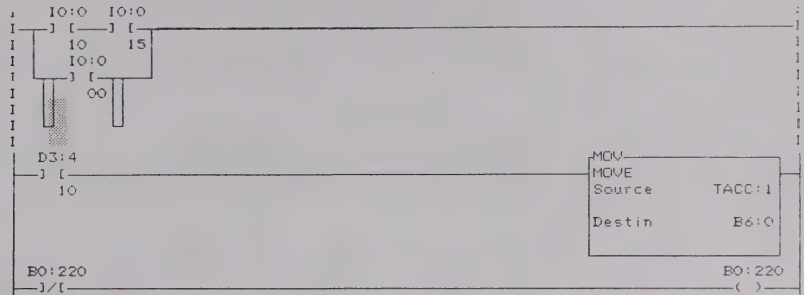
no edits RUNG INSERT

Direct Connect

TARGET TARGET TARGET

A B C
F1 F2 F3

Press [F1] - Target A. The branch starts and ends to the left of the XIC instruction as shown in the next display.



Type a mnemonic or press a key for desired editing function.

(Rung M:O)

PROGRAM no forces

BRANCH

*

F1

APPEND

INSTR

F3

INSERT

INSTR

F4

MODIFY

INSTR

F5

DELETE

INSTR

F6

UNDEL

INSTR

F7

no edits RUNG INSERT

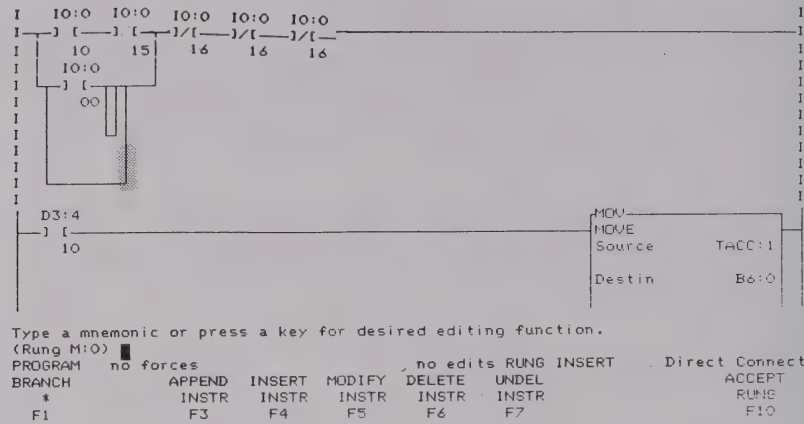
Direct Connect

ACCEPT

RUNG

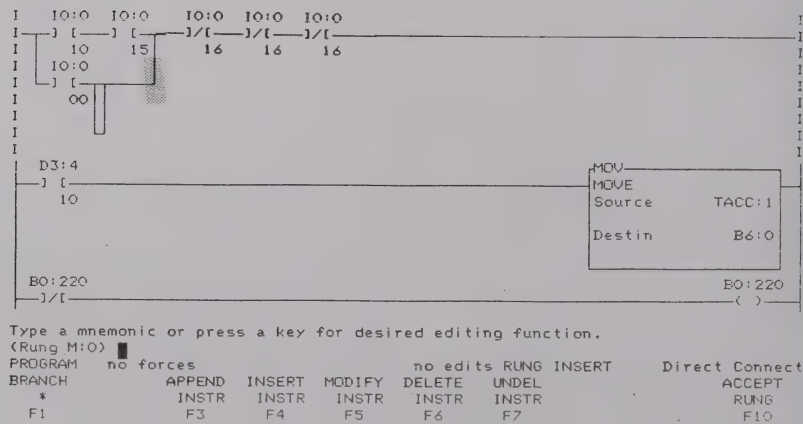
F10

Had we chosen [F3] - Target C, the new branch would have looked like this:



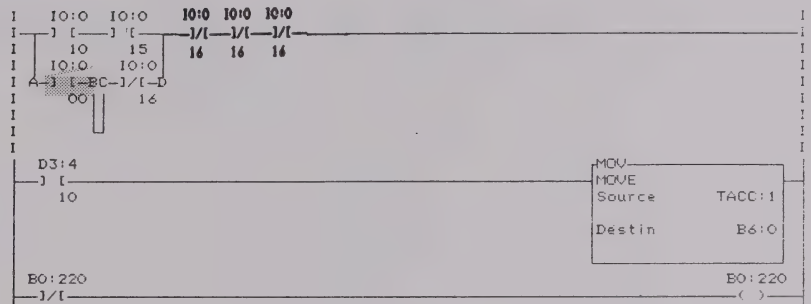
Deleting Branches

You can delete a branch from the display by positioning the cursor on the branch and pressing [F1] - Branch, then [F6] - Delete Branch. For example, we deleted the branch from the previous display. This is the display:



Re-inserting Deleted Branches

1. Position the cursor on the rung where you want to insert the previously deleted branch. For example, we will re-insert the branch that we deleted in the previous section.
2. Press [F1] - Branch, then [F7] - Undelete Branch.
3. Press [F3] - Append to place the branch to the right of the cursor or [F4] - Insert to place the branch to the left of the cursor.



Press a key or enter a letter to choose branch ending target.

(Rung M:O) ☐

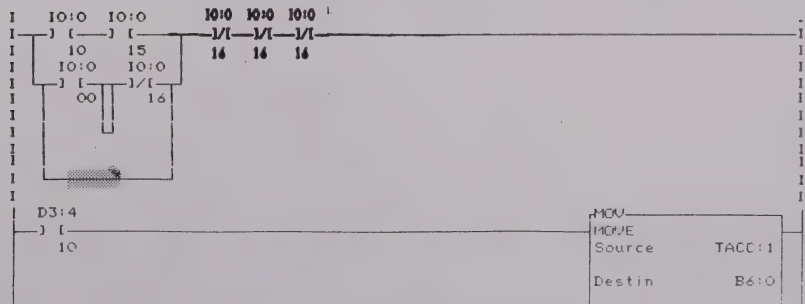
PROGRAM no forces

no edits RUNG INSERT

Direct Connect

TARGET	TARGET	TARGET	TARGET
A	B	C	D
F1	F2	F3	F4

4. Choose the target for the branch end point. In our example, we chose target A, function key [F1].



Type a mnemonic or press a key for desired editing function.

(Rung M:O) ☐

PROGRAM no forces

no edits RUNG INSERT

Direct Connect

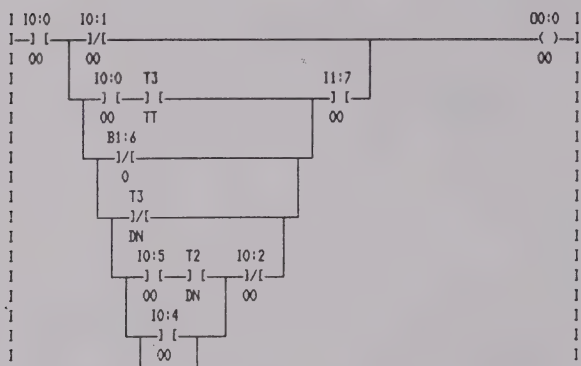
BRANCH	APPEND	INSERT	MODIFY	DELETE	UNDEL	ACCEPT
*	INSTR	INSTR	INSTR	INSTR	INSTR	RUNG
F1	F3	F4	F5	F6	F7	F10

Creating Nested Branches

You can create branches that are nested (branches within branches) to simplify the ladder logic. The nested branches that you create can contain:

- a combination of condition and output instructions on the output side of the rung
- a maximum of 16 nested branch levels

To create a nested branch, follow the procedure used for inserting branches. The following ladder diagram shows an example of nested branching.



Type a mnemonic/press a key for desired editing function.

(Rung M:5)

PROGRAM

forces disabled

edits disabled

memory UNPROTECTED

BRANCH

4

APPEND

INSERT

MODIFY

DELETE

UNDEL

ACCEPT

INSTR

INSTR

INSTR

INSTR

INSTR

RUNG

F1

F3

F4

F5

F6

F7

F10

Accept Rung [F10]

You press [F10] Accept Rung to get the rung into the processor.

Addressing

You can specify PLC-3 addresses in two ways:

- . data table addressing
- . extended addressing

You will typically use data table addressing.

Data Table Addressing

You can specify data table sections of memory by using data table addressing. In data table addressing, you specify a data table section, then a file, word, or bit.

Note: You enter a colon or semi-colon before the word number and a slash before the bit number. (You can enter a semi-colon in an address anywhere that a colon is valid, except in procedures.) This table shows the data table section specifiers.

Section Specifier	Extended Address	Data Table Section
O	3.1.1	Output
I	3.1.2	Input
T	3.1.3	Timers
C	3.1.4	Counters
N	3.1.5	Integers
F	3.1.6	Floating Point
D	3.1.7	Decimal (BCD)
B	3.1.8	Binary
A	3.1.9	ASCII
H	3.1.10	High Order Integers
S	3.1.13	Status

| | |
 | | memory section
 | memory context
memory area

Timer and Counter Bit Addressing

Here are four ways to enter time and counter control word bit addresses:

For example, to enter the done bit for timer 1:

- . T1/15
- . T1.DN
- . T1/DN
- . TCTL1/15
- . T1.TD
- . T1/TD

These will all display as T1/TD.

For example, to enter the enable bit for counter 3:

- . C3/12
- . C3.EN
- . C3/EN
- . CCTL3/12

These will all display as C3/EN.

Similar addressing methods can be used for addressing all timer and counter control bits.

File Addressing

The way you enter file addresses is different from T4 addressing. You use a # (pound sign) instead of an "F" to designate a file address. For example, #N1 addresses integer file 1 (FN1 would be the address on a T4 terminal).

Extended Addressing

Extended addressing can access any area of PLC-3 memory. You can use extended addressing with MVS and MSG instructions, and to access memory areas outside of the data table section.

When using extended addressing, you enter E followed by the memory area. Then you enter parameters (levels) that the memory area requires, separated by periods to specify a memory address (down to the bit level, if necessary). For example, if you are specifying a data table address, you enter E3 to specify the data table. Then you must enter a context number, file number, structure, word, and bit. The table on the next page outlines the memory areas along with the required parameters.

From publication 1775-6.4.1

PLC-3 Extended Addressing Table

Area	E#	.x	.x	.x	.x	.x
system status	E0	context = 0	section = 0	word = 0-20	not used	not used
module status	E2	module type = 1-memory 2-main processor 3-S4A I/O scanner 5-communication adapter 6-expansion 7-S4B I/O scanner 8-peripheral communication 9-data highway II interface 14-memory communication	thumbwheel switch = 1-15	module data	module data	module data
data table	E3	context = 1-15	section = 1-output image 2-input image 3-timers 4-counters 5-integers 6-floating point 7-decimal 8-binary 9-ASCII 10-high order int. 12-pointers 13-status	file = 0-999 0-999 0 0 0-999 0-999 0-999 0-999 0-999 0-999 0 0-999	structure = 0 0 0-9999 0-9999 0 0-9999 0 0 0-9999 0-9999 0	word = 0-7777 ₈ 0-7777 ₈ 0-CTL, 1-PRE, 2-ACC 0-CTL, 1-PRE, 2-ACC 0-9999 0-9999 0-9999 0-9999 0-9999 0-SEC, 1-FIL, 2-WRD 0-9999
ladder program	E4	context = 1-15	section = 0-program status 1-main 2-subroutine 3-fault routine	rung = 0-32,767	instruction = 0-32,767	word = 0-32,767
message	E5	context = 1-15	section = 1-report generation 2-rung comments 3-terminal (MACROS) 4-data highway 5-assistance (HELP)	message = 0-32,767	word = 0-32,767	not used
system symbols	E6	context = 1-15	type = 1	symbol = 0-32,767	word = 0-32,767	not used
converted procedures	E8	context = 1-15	section = 1-report generation	message = 0-32,767	word = 0-32,767	not used
force table	E10	context = 1-15	force type = 0-status 1-forced output 2-forced input	rack = not used 0-64 0-64	word = 0 0-15 0-15	bit = 0-input forces enabled/disabled 1-output forces enabled/disabled not used not used

You can specify an octal address format for the extended addresses by entering a leading zero in the file, word, and/or bit positions of the address. This table shows some examples of extended addressing:

Extended Address	Description
E3.1.2.3.0.0	This address specifies the data table (3), context (1), input image table (2), file (3), structure (0), and word (0).
E3.1.8.1.0.5 or \$B1:5	These addresses specify binary file 1 word 5.
E3.1.8.0.0.1/10 or E3.1.8.0.0.01/012	These addresses specify binary file word 1, bit 10. The octal value 12 is 10 decimal.

Status Line Messages

This table lists messages you may see on the status line in the ladder editor display.

If you see this message on the status line:	It tells you:
RUN	PLC-3 processor is in run mode
TEST	PLC-3 processor is in test mode
PROGRAM	PLC-3 processor is in program mode
FAULTED	PLC-3 processor is faulted
Proc addr XX, octal	octal Data Highway Plus station address of PLC-3 processor
no forces	the program contains no forced bits
forces ENABLED	force function is enabled
forces DISABLED	force function is disabled
no edits	the program contains no unassembled rungs
edits ENABLED	the program contains unassembled rungs that are being executed
edits DISABLED	the program contains unassembled rungs that are not being executed.
testing edits	the program contains unassembled edits that are being executed
Direction: DOWN	the software is in search mode and current direction of search is down
Direction: UP	the software is in search mode and current direction of search is up

If you see this message
on the status line:

It tells you:

Wrap: ON

if direction of search is DOWN, after reaching last instruction in program, the search will wrap around to first instruction in program automatically. If direction of search is UP, after reaching the first instruction in program, the search will wrap around to last instruction in program automatically.

Wrap: OFF

if the direction of the search is DOWN, after reaching the last instruction in program, the search stops. If the direction of the search is UP, after reaching first instruction in program, the search stops.

decimal data

data is displayed in decimal format

binary data

data is displayed in binary format

octal data

data is displayed in octal format

ASCII data

data is displayed in ASCII format

hex/bcd data

data is displayed in hex/bcd format

unsigned integer data

data is displayed in unsigned integer format

floating point data

data is displayed in floating point format

decimal addresses

data table addresses are displayed in decimal

octal addresses

data table addresses are displayed in octal

Chapter Objectives

In this chapter you will read about how to change the way the rungs, addresses, and program comments are displayed in the ladder program.

Display Configuration

When you press [F2] - **Configure Display** in the ladder editor, the following display appears:

Press a key for desired mode of display.

PROGRAM	no forces	no edits	Direct Connect
SINGLE	MULT	SELECT	DISPLAY
RUNG	RUNG	RUNG	DISP
F1	F2	F3	F7 F8 F9

Rung Displays

You can display:

- a single rung (F1)
- multiple consecutive rungs (as many as will fit on the screen). This is the default display mode. (F2)
- a group of rungs from one program section, M, S, or F. The rungs need not be consecutive (F3).

Selecting a group of rungs is especially useful when making changes that affect various rungs scattered throughout a program. You can collect and display just those rungs. You do this by entering the list of rungs you want to display or by pressing [F3] - Select Rung.

1. When you press [F3] - Select Rung, you are prompted to enter the list of rungs you want to display or you can recall the last list entered by pressing [F1] - Previous List.
2. Enter the rung numbers, separating each with a comma. If you want to display rungs in the section you are in, you do not need to proceed the rung with an M, S, or F. If you want to display rungs from a different section, you must proceed the rung with the appropriate M, S, or F. Here is an example showing you that your rungs can be entered in any order.

M77, M3, M12, M143

Note: You cannot mix rungs from main, subroutine and fault routine sections.

The display is updated to show just those rungs. The rung number is displayed at the top left of each rung.

Displaying Comments and Symbols

[F7] - Display Rung Comments toggles between rung comments appearing or not appearing on the screen.

[F8] - Display Instruction Comments toggles between instruction and address comments appearing or not appearing on the screen.

[F9] - Display Symbols toggles between symbols assigned to instruction addresses appearing or not appearing on the screen.

Note: The word "Display" will change to "Suppress" when you press [F7], [F8], or [F9]. When "Display" is shown, comments **are not** displayed. When "Suppress" is shown, comments **are** displayed.

See chapter 15 - Program Documentation for information about symbols and program comments.

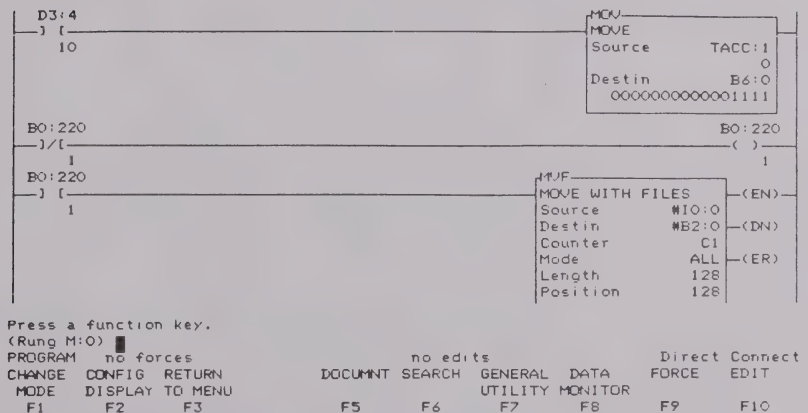
Chapter Objectives

In this chapter you will read how to change the processor operating mode.

How To Change Processor Modes

The processor operating modes are:

- PROGRAM - Used to edit any rung in a ladder logic program without executing the program.
- TEST - The processor executes the ladder logic program without actually controlling any output devices. The processor updates the data and forcing tables.
- RUN - The processor executes the ladder logic program, controls outputs, and updates the data and forcing tables.



The part of the status line that shows the processor's present operating mode is located below the rung location information. You can change this mode by pressing [F1] - Change Mode. You can also change the mode from anywhere in the ladder editor by pressing [ALT] [C].

Important: The processor must have the "remote enable" resource, which you can obtain through the "LIST" function. To obtain "remote enable" you must use LIST from the PIC-3 front panel.

The display changes as follows:

D3:4	[	10	MOV	MOVE	TACC:1	
			Source		0	
			Destin	B6:0	0000000000001111	
BO:220	)/[	1				BO:220
BO:220	[	1	MOV	MOVE WITH FILES		(EN)
			Source	#10:0		
			Destin	#B2:0		(DN)
			Counter	C1		
			Mode	ALL		(ER)
			Length	128		
			Position	128		

Press a key for desired processor mode.

PROGRAM	no forces	no edits	Direct Connect
PROGRAM TEST RUN			
MODE MODE MODE			
F1 F2 F3			

As you can see, the three choices are:

- . F1 - Program Mode
- . F2 - Test Mode
- . F3 - Run Mode

Pressing [F1] or [F2] changes the mode to program or test, respectively, and the screen automatically reverts to the previous display.



CAUTION: You are not asked to confirm your choice when going to program or test mode.

When you press [F3], you need to confirm your choice by typing:

- . [Y] [ENTER] for yes
- . [N] [ENTER] or [ESCAPE] to exit the procedure without changing the mode

or by pressing either the [F1] - Yes or [F5] - No function keys.

The screen still displays the change mode keys in case you have to change back to program or test mode. In all cases, the status line changes to reflect the current operating mode.

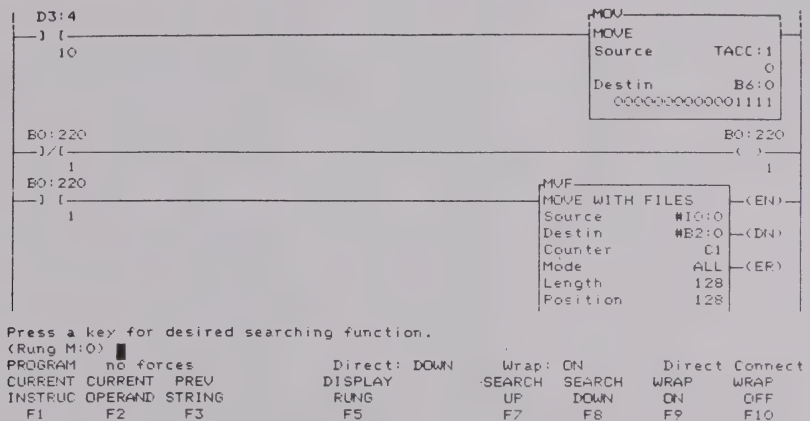
Pressing [ESCAPE] returns you to the previous screen.

Chapter Objectives

In this chapter you will read about how to search for instructions, addresses, and rungs in a ladder logic program by instruction mnemonic, address and rung number.

Instruction, Rung and Address Searches

When you press [F6] - Search at the Monitor Program display, or press [ALT] [S] from most places in the ladder editor, the following display appears:



You can search for:

- a rung
- an instruction
- word address or symbol
- file address or symbol
- bit address or symbol (you must also include the instruction mnemonic)
- an instruction with an address or symbol

You can enter the instruction's 3-letter mnemonic or the symbol if it exists, the address of the instruction or the rung number (after pressing [F5] - Display Rung) for which you are searching.

Entering the mnemonic and pressing [ENTER] searches for the next instruction with that mnemonic. When searching for an instruction, the software can only find instructions before or after the cursor. The instruction that the cursor is on is not a valid target.

Searching for Address

If you enter the address, you do not have to enter the entire address. For example:

- . entering I searches for the next instruction with address I0:0 in the program
- . entering I:0 searches for the next instruction that is addressed by input word 0 of file 0. Entering a mnemonic and the address searches for that specifically addressed instruction.
- . entering XIC,I:0/0 is more specific in that it searches for the next XIC instruction addressed by bit 0 in input word 0 of file 0.
- . entering MOV, N4:4, N4:5 searches for the move instruction with the source address of N4:4 and a destination address of N4:5. If you enter more than one address, they must be in the same order as prompted for when you enter the instruction initially.
- . you can search for an address/instruction combination. For instructions with more than one address, you can specify any address within that instruction to search for. However, to do this you must first fill in all addresses in the order they appear in the instruction. If you don't want to fill in specific addresses, you can use an "*" as a "don't care" character. For example, to search for the Source B address within a SEQ (search equal) instruction we might enter **SEQ, *, F10:3**. In this example we didn't care what the Source A address was and so we entered "*" for the Source A address. Here's another example. To search for the Control Address in a BTR instruction, we might enter **BTR, *, *, *, #B3:7**.
- . you must always specify the instruction and address when searching for a bit address.
- . you can search for a word or file address without specifying an instruction.
- . you cannot search for an extended address.

Each time you press [ENTER], the search continues. Pressing [ESCAPE] returns you to the display from which you initiated the search.

Searching for Rung

Search for a rung by selecting [F5] Display Rung. Enter the rung number for which you want to search. For example: M12, S31, F9.

Search Menu

You use the following keys for search functions:

Function Key	Function
[F1] - current instruction	Shows the mnemonic of the instruction that the cursor is on.
[F2] - current operand	Shows the address of the instruction or the first operand of a block instruction that the cursor is on. Pressing F1, then F2 allows you to search for the current address and mnemonic.
[F3] - previous string	Shows the mnemonic and/or the address of the last instruction searched for.
[F5] - display rung	Displays the "display rung" screen, which prompts for a rung number. If you want to go to a rung in the same section, you do not need to proceed the rung with an M, S, or F. If you want to go to different section, you must proceed the rung with the appropriate M, S, or F.
[F7] - search up	Direction of the search is toward the top of the ladder diagram.
[F8] - search down	Direction of the search is toward the bottom of the ladder diagram.
[F9] - wrap on	When the processor reaches the end of the ladder diagram, it goes to the other end and continues the search.
[F10] - wrap off	When the processor reaches the end of the ladder diagram, it stops the search.

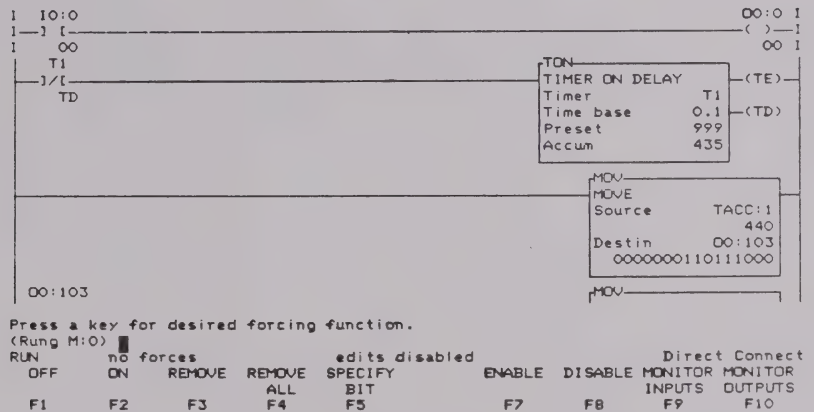
Chapter Objectives

In this chapter you will read about:

- disabling and enabling forced bits
- forcing a bit on or off
- monitoring inputs and outputs
- removing forces from bits

Force Monitor

When you press **[F9] - Force** at the monitor program display, the following display appears:



This is the force monitor menu display. We have entered a rung in our sample display and will refer to it for our examples. The function keys that appear at the bottom of the display are described in the following sections.

Function Key	Action
[F1] - Off	Forces a bit off (0). This procedure is described in detail in the following sections.
[F2] - On	Forces a bit on (1). This procedure is described in detail in the following sections.
[F3] - Remove	Removes a single forced bit (that the cursor is on) from the data table. This procedure is described in detail in the following sections.
[F4] - Remove All	Pressing this key will remove all forced bits from the data table after confirmation.
[F5] - Specify Bit	Finds and displays a forcible bit not currently on the screen.
[F7] - Enable	Pressing this key will enable all forced bits after confirmation.
[F8] - Disable	Pressing this key will disable all forced bits after confirmation.
[F9] - Monitor Inputs	Displays the force monitor screen for inputs. This procedure is described in detail in the following sections.
[F10] - Monitor Outputs	Displays the force monitor screen for outputs. This procedure is described in detail in the following sections.

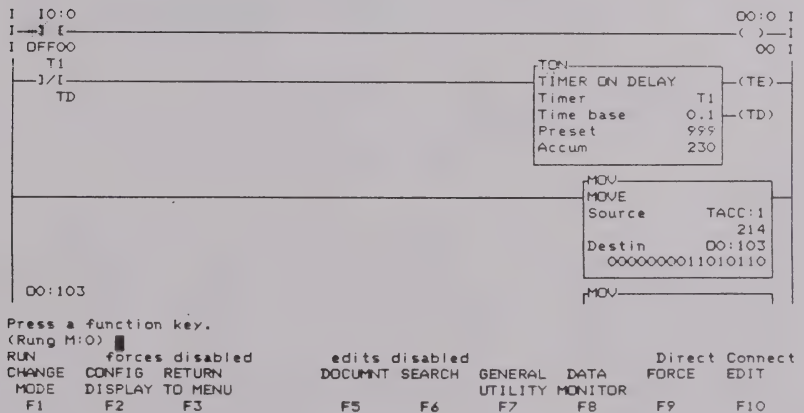
Forcing I/O Bits

Forcing bits on or off allows you to fully simulate operation of a ladder logic program or control an output device. Forcing inputs will force the bit in the data table and forcing outputs will force the actual device and not the bit in the data table. You can only force bits in input or output file 0, up to word 3777 octal. In other words, you can only force live I/O points.

Force Off and On

You use this procedure to force a bit off or on.

1. Position the cursor on the bit instruction that you want to force.
2. Press [F1] - Off (or [F2] for on). The bit is now forced off. A "0" will be displayed in the force table and the word "OFF" appears next to the bit number on the rung.



You can see the result by pressing [F9] - Monitor Inputs (if it was an input bit) or [F10] - Monitor Outputs (if it was an output bit). Pressing [ESCAPE] returns you to the monitor program display.

To get this display, we pressed [F10] Monitor Outputs.

address	17	data	0	address	17	data	0
00:00000	...	...	...	00:00020	...	...	...
00:00001	...	0...	1...	00:00021	...	...	...
00:00002	...	...	...	00:00022	...	...	...
00:00003	...	...	...	00:00023	...	1.	...
00:00004	...1	...1.	1...	00:00024	...	...	1.
00:00005	...	...	...	00:00025	...	...	...
00:00006	...	...	00.	00:00026	...	0.	...
00:00007	...	...	...	00:00027	...	...	1.
00:00010	...	1.1	...	00:00030	...	...	...
00:00011	...	...	...	00:00031	...	1	...
00:00012	...	...1	...1	00:00032	...	...	...
00:00013	...	...	0...	00:00033	...	1.	...
00:00014	...	1.	...	00:00034	...	...	...
00:00015	...	...	...	00:00035	...	...	...
00:00016	...1.	...1.	...1.	00:00036	...	...	11.
00:00017	...	...	...	00:00037	...	...	...

Press a key or enter force value.

force 00:00000/012 to

PROGRAM	forces disabled			octal addr		ENABLE	DISABLE	Addr 53	
OFF	ON	REMOVE	REMOVE ALL	SPECIFY BIT	DATA MONITOR			NEXT PAGE	PREV PAGE
F1	F2	F3	F4	F5	F6	F7	F8	F9	F10

Removing a Force

You use this function to remove a single forced bit. Here is the procedure.

1. Position the cursor on the bit instruction from which you want to remove the force.
2. Press [F3]. The forced bit is now removed and a "." (period) will be displayed in the force table.

You can also remove all of the forces in a data file by pressing [F4] - Remove All. When you do this, you are asked to confirm your selection by typing [Y] [ENTER].

You can see the result by pressing [F9] - Monitor Inputs (if it was an input bit) or [F10] - Monitor Outputs (if it was an output bit). Pressing [ESCAPE] returns you to the monitor program display.

Enabling and Disabling Forces

When you enable forced input or output bits, the processor enables the on or off condition.

Disabling forced bits tells the processor to ignore the on or off condition that appears in the force table for each forced bit.

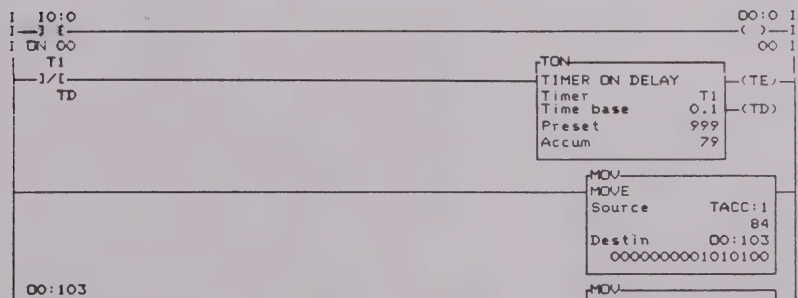


WARNING: When any output is forced on or off, keep personnel away from the machine area. Forcing an output can cause unexpected machine motion that could injure personnel.

You enable or disable the force function by pressing [F7] or [F8], respectively. You are asked to confirm your selection by typing:

- [Y] [ENTER] for yes
- [N] [ENTER] or [ESCAPE] to exit the procedure without disabling the force function

When you type [Y] [ENTER], the forced instruction(s) on the rung is intensified and the status line displays "forces ENABLED". Typing [N] [ENTER] or [ESCAPE] returns you to the previous display.



Press a function key.

(Rung M:0) ☒

forces ENABLED
CHANGE CONFIG RETURN
MODE DISPLAY TO MENU
F1 F2 F3

edits disabled
DOCUMENT SEARCH
F5 F6

GENERAL DATA
UTILITY MONITOR
F7 F8

Direct Connect
FORCE EDIT
F9 F10

Monitoring Inputs and Outputs

When you press [F9] or [F10], the input or output force table is displayed. Here is an example of the output force table:

address	17	data	0	address	17	data	0
00:00000		11..	....	00:00020	....	....	....
00:00001		... 0...	1...	00:00021	....	....	....
00:00002				00:00022	....	....	....
00:00003				00:00023	....	..1.	....
00:00004		..1.	1...	00:00024	....	....	..1.
00:00005				00:00025	....	....	....
00:00006			..00.	00:00026	....	..0.	....
00:00007				00:00027	....	....	1...
00:00010		1..1	....	00:00030	....	....	....
00:00011				00:00031	....	..1.	....
00:00012		...1	..1	00:00032	....	....	....
00:00013			0...	00:00033	....	..1.	....
00:00014		..1.	....	00:00034	....	....	....
00:00015				00:00035	....	....	....
00:00016		..1.	..1.	00:00036	....	....	11..
00:00017			1...	00:00037	....	....	....

Press a key or enter force value.
force 00:00000/012 to

PROGRAM	forces disabled			octal addr		ENABLE	DISABLE	Addr 53	
OFF	ON	REMOVE	REMOVE	SPECIFY	DATA			NEXT	PREV
			ALL	BIT	MONITOR			PAGE	PAGE
F1	F2	F3	F4	F5	F6	F7	F8	F9	F10

The input force table is similar. Both force tables use the same function keys displayed at the bottom of the display. You should note that most of the function keys that appear at the bottom of the display are the same as in previous displays. See the previous sections on enabling and disabling forces, removing forces and how to use these keys.

Forcing Bits From the Force Monitor

You can force input and output bits while in either of the force monitor displays. You do this by:

1. positioning the cursor on the bit address that you want to force.
2. pressing 1 to force on or 0 to force off, followed by [ENTER] or pressing [F1] - Off or [F2] - On.

The 1 or 0 appears in the display and the word ON or OFF appears next to the bit in the rung display.

Removing Forces From the Force Monitor

You can remove forces from input and output bits while in either of the force monitor displays. You do this by:

1. positioning the cursor on the bit address from which you want the force removed.
2. pressing "." (period) followed by [ENTER] or pressing [F3] - Remove Force.

A "." appears in the display (replacing the 1 or 0) and the word ON or OFF is removed from the rung display.

Chapter Objectives In this chapter we will show you how to:

- . display the processor data tables
- . display data in several formats
- . change data

Displaying the Processor Data Table

When you press **[F8] - Data Monitor** at the monitor program display you will see a display similar to the following. This data is constantly updated from the processor.

address	17	data	0	address	17	data	0
IO:00000	1010	1010	1011	1011	IO:00020	1010	1010
IO:00001	1010	0010	0011	0100	IO:00021	0001	0010
IO:00002	0010	0011	0100	0101	IO:00022	1111	1111
IO:00003	1110	1110	0010	0010	IO:00023	1101	1101
IO:00004	0000	0000	0101	0110	IO:00024	0100	0101
IO:00005	0111	0111	0110	0101	IO:00025	0110	0111
IO:00006	0111	0111	1110	1101	IO:00026	1001	0000
IO:00007	1100	1011	1010	1101	IO:00027	0101	0100
IO:00010	1110	1110	1101	1101	IO:00030	1010	1101
IO:00011	0011	0100	0101	0110	IO:00031	0000	0000
IO:00012	1111	1111	1110	1110	IO:00032	0000	0000
IO:00013	1110	1110	0100	0101	IO:00033	0000	0000
IO:00014	1010	1010	1101	1101	IO:00034	0100	0100
IO:00015	0010	0011	0100	0101	IO:00035	1110	1110
IO:00016	0000	0000	0101	0101	IO:00036	0010	0011
IO:00017	0001	0010	0011	0100	IO:00037	1110	1110

Press a key or enter value.

IO:00037/000 = **1**

PROGRAM forces disabled

CHANGE

RADIX

F1

octal addr	binary data	Addr 53
SPECIFY	FORCE	NEXT
ADDRESS	MONITOR	FILE
F5	F6	F7
		F8
		F9
		F10

[F1] - Change Radix

Press this key change the format of the data and addresses as they appear on the screen. You will see the following display:

```

address      17      data      0      address      17      data      0
IO:00000      1010 1010 1011 1011 IO:00020      1010 1010 1010 1010
IO:00001      1010 0010 0011 0100 IO:00021      0001 0010 1110 1101
IO:00002      0010 0011 0100 0101 IO:00022      1111 1111 1100 1100
IO:00003      1110 1110 0010 0010 IO:00023      1101 1101 1110 1111
IO:00004      0000 0000 0101 0110 IO:00024      0100 0101 0110 0111
IO:00005      0111 0111 0110 0101 IO:00025      0110 0111 1000 1001
IO:00006      0111 0111 1110 1101 IO:00026      1001 0000 1000 0000
IO:00007      1100 1011 1010 1101 IO:00027      0101 0100 0011 0010
IO:00010      1110 1110 1101 1101 IO:00030      1010 1101 1111 1110
IO:00011      0011 0100 0101 0110 IO:00031      0000 0000 1001 1001
IO:00012      1111 1111 1110 1110 IO:00032      0000 0000 0111 0111
IO:00013      1110 1110 0100 0101 IO:00033      0000 0000 0110 0110
IO:00014      1010 1010 1101 1101 IO:00034      0100 0100 0000 0000
IO:00015      0010 0011 0100 0101 IO:00035      1110 1110 0101 0110
IO:00016      0000 0000 0101 0101 IO:00036      0010 0011 0100 0101
IO:00017      0001 0010 0011 0100 IO:00037      1110 1110 1101 1111

Press a key for desired radix.
IO:00000/000 = █
RUN      forces ENABLED      octal addr      binary data      Direct Connect
BINARY  OCTAL  DECIMAL  HEX/BCD  ASCII  UNSIGNED  OCTAL  DECIMAL
DATA    DATA  DATA    DATA   DATA   DATA    ADDRESS ADDRESS
F1      F2      F3      F4      F5      F6              F9      F10

```

By pressing function keys [F1] through [F6], you can change the **data format**. Pressing [ESCAPE] returns you to the data monitor display.

Function Key	Data Format
[F1]	Binary
[F2]	Octal
[F3]	Decimal
[F4]	Hexadecimal/BCD
[F5]	ASCII
[F6]	Unsigned Data
[F9]	Octal Address
[F10]	Decimal Address

Pressing function key [F9] or [F10] changes the address display to **octal** or **decimal format**. The data table originally appears in the default format for the selected file. Pressing [ESCAPE] returns you to the data monitor display.

[F5] - Specify Address

Press this key to select an address to monitor. Enter either the full address or a section specifier and press [ENTER]. If you enter a section specifier (e.g., T for timers), the data monitor display will start at the beginning of the section.

When you display the timer section, you will notice the PLC-3 processor does not update the time base column.

You can also enter an extended address to access memory other than the data table, such as memory section 5 for messages.

When using extended addressing with the Data Monitor, you must specify all addresses to the word level. For example, you can't enter the abbreviated address E3.1.5 to monitor E3.1.5.0.0.0.

When using extended addressing with Data Monitor, you can only examine word 0 of a timer, counter, or file instruction. You will see the formatted display screen. When examining words 1 and greater, an error is displayed.

[F6] - Force Monitor

Displays the force monitor screen **only** if the currently monitored address is in input file 0 or output file 0. See chapter 10 for a detailed discussion.

**Next File
Previous File
[F7] and [F8]**

Pressing [F7] - Next File displays the next higher numbered data-type file. [F8] - Previous File displays the next lower numbered file.

**Next Page
Previous Page
[F9] and [F10]**

Each time you press [F9] - Next Page, the screen displays the next block of addresses, if the file contains them.

Pressing [F10] - Previous Page displays the previous page of address, if the file contains them.

Pressing [ESCAPE] returns you to the ladder program display.

Entering and Changing Data

You can enter new data or change existing data in all of the data displays. When you display a data file using the procedures described in the previous sections, you will see a cursor displayed on a bit or word in the file.

When displaying with extended addresses, you can monitor values but you cannot change them.

You can move the cursor to any bit or word location in the file display with the four cursor keys. When you have positioned the cursor, enter the value for that bit or word and press [ENTER].

Key(s)	Moves the cursor:
up arrow	up one character
down arrow	down one character
right arrow	right one character
left arrow	left one character
[CTRL] up arrow	top of current column
[CTRL] down arrow	bottom of current column
[CTRL] right arrow	last (right) column of current row
[CTRL] left arrow	1st (left) column of current row
[HOME]	top-left of display
[END]	bottom-right of display

Chapter Objectives

In this chapter you will read how to:

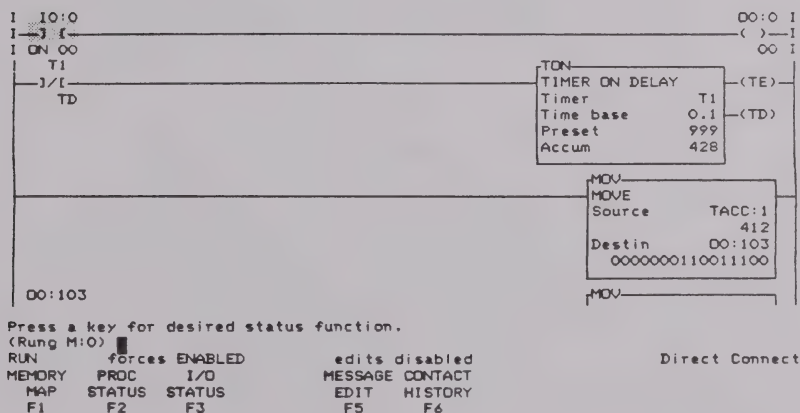
- . interpret the memory map and associated file types
- . interpret processor and I/O status information
- . use contact histograms

Processor Utility Menu

When you press [F7] - General Utility at the Monitor Program display, the utility display appears.

The options shown on the function key menu are:

- . Memory Map [F1]
- . Processor Status [F2]
- . I/O Status [F3]
- . Message Edit [F5] (see chapter 13)
- . Contact Histogram [F6]



Memory Map

When you press [F1] - Memory Map, the following display shows the sizes of each area of PLC-3 memory. Sizes are given in words.

```

                                MEMORY MAP
                                CONTEXT # 1

SECTION                        SIZE
DATA TABLE                   10039
PROGRAM                       575
MESSAGES                      23
SYSTEM SYMBOLS                38
CONVERTED PROCEDURES          0
FORCE TABLE                  80

11274 OF 32768 WORDS USED, 21494 WORD(S) AVAILABLE.

Press a key for memory section.

PROGRAM          memory UNPROTECTED
DATA  PROGRAM MESSAGE  SYSTEM CNVRTD  FORCE
TABLE          SYMBOLS  PROCS  TABLE
F1      F2      F3      F4      F5      F6

```

Direct Connect

This table shows the amount of processor memory (in words) assigned to each area (data table, program, messages, system symbols, procedures, and force table) of a given context. It also lists the total number of words used in the processor and the number of words remaining. You can also create sections of data table memory by selecting [F1] Data Table from this display.

These six function keys allow you to display the memory map screen for each of these sections.

- . [F1] - Data Table
- . [F2] - Program
- . [F3] - Message
- . [F4] - System Symbols
- . [F5] - Procedures
- . [F6] - Force Table

[ESCAPE] returns you to the monitor program display.

Data Table Map

This display lists the number of the last file that exists and the number of words used for each section.

DATA TABLE MAP			
SECTION	LAST FILE	SIZE	
OUTPUT	0	260	
INPUT	0	260	
TIMERS	0	10	
COUNTERS	0	7	
INTEGER	0	5	
FLOATING POINT	0	6	
HEX/BCD	0	5	
BINARY	0	11	
ASCII	0	5	
HIGH ORDER INTEGER	0	6	
POINTERS	0	6	
STATUS FILES	4	330	

1870 OF 32768 WORDS USED, 30898 WORD(S) AVAILABLE.

Press a key for memory section.

memory UNPROTECTED					Direct Connect				
RUN	CREATE	DELETE	OUTPUT	INPUT	TIMERS	COUNTER	INTEGER	FLOAT	NEXT
DT FILE	DT FILE							POINT	PAGE
F1	F2	F3	F4	F5	F6	F7	F8	F9	

These function keys are available:

Function Key	Function
[F1] - create data file	Prompts you for the address to create, asks for confirmation and creates the data table file up to the address you entered.
[F2] - delete data file	Prompts you for the address to be deleted, asks for confirmation, and deletes the data table file from the address you entered to the end.
[F3] - output	Displays map of output files.
[F4] - input	Displays map of input files.
[F5] - timers	Displays the timer map.

[F6] - counters	Displays the counter map.
[F7] - integer	Displays map of integer files.
[F8] - float point	Displays map of floating point files.
[F9] - next page	Displays the next page of the data table map. Similar function key designations allow you to display the remaining section maps.

When you display one of the section maps, function keys are available to create and delete a file, display addresses in octal or decimal format and display the next or previous page of addresses (if any).

Each map lists the file number (when appropriate), last address and file size, as well as total words used and words remaining in the section. For example, here is the output map:

```

                                OUTPUT MAP
                                -----
                                FILE      LAST ADDRESS      SIZE
                                O          00:00377          256

260 WORD(S) USED IN 1 OUTPUT FILE(S)
1870 OF 32768 WORDS USED, 30898 WORD(S) AVAILABLE.

Press a key or enter file number.
RUN
CREATE  DELETE
DT FILE DT FILE
F1      F2

                                octal addr
                                -----
                                OCTAL  DECIMAL
                                ADDRESS ADDRESS
                                F6      F7

                                Direct Connect
                                NEXT  PREV
                                PAGE  PAGE
                                F9     F10
```


Deleting Data Files

When you press [F2] - Delete Data File, you are asked to enter the address to delete. Here is an example of similar addresses and the data that would be deleted with each.

Address	Deletes:
B1:5	addresses B1:5 through the end of file B1
#B1:5	addresses B1:5 through the end of file B1
B1:0	entire B1 (binary file #1) file
#B1:0	entire B1 (binary file #1) file
B	binary file #0
#B	all binary files
#B2	all binary files except #B0 and #B1
B2	binary file B0, word 2 through the end of file B0

Important: Deleting data table files differs between the software and a T4 Industrial Terminal. **Using a T4 terminal**, entering B0:0 deletes file 0 of the binary section; entering B deletes the entire binary section. **Using the software**, entering B0:0 or B deletes only file 0 of the binary section.

Program Map

The program map lists the number of main, subroutine, and fault rungs and the number of words associated with each, as well as the total number of words used and remaining. The maximum number of rungs in any of the 3 sections is 32767.

PROGRAM MAP

```
11 MAIN RUNG(S) USING 50 WORD(S)
1 SUBROUTINE RUNG(S) USING 3 WORD(S)
1 FAULT RUNG(S) USING 3 WORD(S)
```

1870 OF 32768 WORDS USED, 30898 WORD(S) AVAILABLE.

To exit, press <ESC>.

RUN

memory UNPROTECTED

Direct Connect

Message Map

The message map lists the number of words used in these types of messages, as well as the total number of words used and remaining:

- . report generation messages
- . comments
- . terminal macros
- . Data Highway messages
- . help messages

```

                                MESSAGES MAP
1137 WORD(S) USED IN 69 REPORT GENERATION MESSAGES
                                0 WORD(S) USED IN 0 COMMENTS
                                0 WORD(S) USED IN 0 TERMINAL MACROS
                                33 WORD(S) USED IN 2 DATA HIGHWAY MESSAGES.
                                0 WORD(S) USED IN 0 HELP MESSAGES

16976 OF 32768 WORDS USED, 15792 WORD(S) AVAILABLE.

Press a key for memory section.
PROGRAM          memory UNPROTECTED          Direct Connect
REPORT COMMENT MACROS DATA HELP
GEN              F2      F3      DATA HIGHWAY
F1              F4      F5

```

A function key for each type of message allows you to display the message number and size for each type.

System Symbols Map

The system symbols map lists the symbol number and size, as well as the total number of words used and remaining.

SYSTEM SYMBOLS MAP			
SYMBOL NUMBER		SIZE	
0		9	
1		9	
2		9	
3		9	
4		9	
5		9	
6		9	
7		9	
8		9	
9		9	

4585 WORD(S) USED IN 382 SYSTEM SYMBOLS FILE(S)

16976 OF 32768 WORDS USED, 15792 WORD(S) AVAILABLE.

Press a key or enter file number.

PROGRAM	decimal addr	Direct	Connect
		NEXT	PREV
		PAGE	PAGE
		F9	F10

Converted Procedures Map

The converted procedures map lists the procedure number and size, as well as the total number of words used and remaining.

Force Table Map

The force table map lists the I/O rack number (in octal) and the number of words in each rack file. You can have a maximum of 255 racks with a PLC-3 and 16 racks with a PLC-3/10.

FORCE TABLE MAP

INPUT RACK	SIZE	OUTPUT RACK	SIZE
0	16	0	16
1	0	1	16
2	16	2	16
3	16	3	16

142 WORD(S) USED IN 8 FORCE TABLE FILE(S)

17043 OF 32768 WORDS USED, 15725 WORD(S) AVAILABLE.

Press a key or enter file number.

PROGRAM

octal addr

Direct

Connect

NEXT

PREV

PAGE

PAGE

F9

F10

Processor Status

You display the processor status screen from the general utilities display or from the I/O status display.

The only data that are continuously updated in this display are the Arithmetic Status and Arithmetic Flags. You can only change data in the arithmetic status and arithmetic flags fields.

```

OPERATING CONTEXT:      1                      MONITORING CONTEXT:  1
ARITHMETIC STATUS      00000000 00001010
ARITHMETIC FLAGS       S: 1          Z: 0

MINOR FAULT (SYS)      00000000 00000000
                      (S0:2) 00000000 00000000
MAJOR FAULT (SYS)      00000000 00000000
                      (S0:1) 00000000 00000000

WHERE FAULTED
REAL TIME INTERRUPT    0 msec
PROGRAM SCAN [msec] last:          0

WATCHDOG SETPOINT      2550
max:                   0

MODE CONTROL (SYS)     10001001 00001000    NOT BACKED-UP    NOT BACK-UP MODE
                      (S0:3) 10001000 10011000    MEMORY UNPROTECTED

DATE/TIME              1988-02-29  10:12:20
TIME VALID             DATE VALID      INTERNAL CLOCK

Press a key or enter value.
S0:00000/017 = █
PROGRAM forces ENABLED      octal addr  Direct Connect
                           I/O          SPECIFY DATA      CLEAR
                           STATUS        ADDRESS MONITOR    MAJ FLT
                           F3            F5          F6       F10

```

Several messages may be displayed next to the Arithmetic Status field:

Processor Module:	Possible Messages:	Bit in Word S0:0
Series B	Instruction fault	17
	Arithmetic overflow	15
	Arithmetic underflow	14
	Conversion overflow	13
	Conversion underflow	12
	Operand error	11

Status Fields

Arithmetic Status (line 1)	The arithmetic status of the PLC-3 is stored in the upper byte of word S0:0. The messages listed in the previous section correspond to the set state of various bits in this word.
Arithmetic Flags (line 2)	The arithmetic flags are stored in the lower byte of word S0:0. Bit 0 is the zero (Z) flag, bit 3 is the sign (S) flag.
Minor Fault (line 4)	Unchangeable system data stored in E0.0.0.5
Minor Fault (line 5)	In RUN mode, the CPU writes the value of E0.0.0.5 in word S0:2.
Major Fault (line 6)	Unchangeable system data stored in E0.0.0.6
Major Fault (line 7)	Major processor faults are stored in word S0:1.
Where Faulted (line 8)	If the processor has faulted, the location of the faulted program section is stored in address E2.2.1.0.2.0 and the faulted rung number is stored in address E2.2.1.0.1.
Real Time Interrupt (line 9)	The real time interrupt is the preset value (in msec) of a down-counter. The preset is stored at address E4.c.0.2, where "c" is the current operating context. When the preset is reached, the CPU executes the ladder fault routine with Label 1. Initialized with the "LIST" function.
Watchdog Setpoint (line 9)	The watchdog setpoint is the maximum allowable scan time of the ladder program (in tens of msec). It is stored at address E4.c.0.1, bits 10 - 17, where "c" is the current operating context. Initialized with the "LIST" function.
Program Scan (line 10)	The longest program scan time (in tens of msec) encountered by the CPU is stored at address E4.c.0.1, bits 0 - 7, where "c" is the current operating context. The time the CPU took to complete the last program scan is stored at address E0.0.0.13, bits 0 - 7. Reset through "LIST" function.
Mode Control (line 11)	Unchangeable system data stored in E0.0.0.8.
Mode Control (line 12)	In RUN mode, the CPU writes the value of E0.0.0.8 in word S0:3.

Bit	Set	Reset
15	backed up	not backed up
14	back-up mode	not back-up mode
13	memory unprotected	
12	data table change	
11	memory protected	
5	remote control	
4	remote enable	

Date/Time (line 14)	The date and time is stored at addresses E0.0.0.14-E0.0.0.19 corresponding to year, month, day, hour, minute, and second, respectively.
Time Valid (line 15)	Indicates whether the time was initialized using "List". This bit is stored at address E0.0.0.20, bit 2. When set, "Time Valid" is displayed; reset displays "Time Not Valid".
Date Valid (line 15)	Indicates whether the date was initialized using "List". This bit is stored at address E0.0.0.20, bit 4. When set, "Date Valid" is displayed; reset displays "Date Not Valid".
Time Set (line 16)	Displayed when a device is changing the time using "List". This bit is stored at address E0.0.0.2, bit 1.
External Clock (line 16)	Displayed when a device other than the CPU is controlling the clock. This bit is stored at address E0.0.0.20, bit 3.

These function keys are available:

Function Key	Function
[F3] - I/O status	displays the I/O status screen
[F5] - specify address	prompts for an address, then displays the data monitor screen.
[F6] - data monitor	displays the data monitor screen.
[F10] - clear major fault	clears major processor faults

I/O Status

You display the I/O status screen from the general utilities display or from the processor status display by pressing [F3]. It lists the rack number, quarter (4 slots = 1 quarter), fault (1 = faulted, 0 = ok), and retry count.

Note: Data Files S2 and S3 must exist.

RACK	QUARTER	FAULT	RETRY	COUNT	RACK	QUARTER	FAULT	RETRY	COUNT
000	1	0		0	004	1	0		0
000	2	0		0	004	2	0		0
000	3	0		0	004	3	0		0
000	4	0		0	004	4	0		0
001	1	0		0	005	1	0		0
001	2	0		0	005	2	0		0
001	3	0		0	005	3	0		0
001	4	0		0	005	4	0		0
002	1	0		0	006	1	0		0
002	2	0		0	006	2	0		0
002	3	0		0	006	3	0		0
002	4	0		0	006	4	0		0
003	1	0		0	007	1	0		0
003	2	0		0	007	2	0		0
003	3	0		0	007	3	0		0
003	4	0		0	007	4	0		0

Press a key or enter value.
 S2:0000/000 = ☐
 RUN forces ☒ ENABLED

PROC	SPECIFY	DATA	Direct	Connect
STATUS	ADDRESS	MONITOR	NEXT	PREV
F2	F5	F6	F9	F10

These function keys are available:

Function Key	Function
[F2] - processor status	displays the processor status screen
[F5] - specify address	prompts for an address, then displays the data monitor screen.
[F6] - data monitor	displays the data monitor screen.
[F9] - next page	displays the next page of I/O information
[F10] - previous page	displays the previous page of I/O information

Contact History

To run [F6] Contact History, you must be connected to a 1775-GA or 1775-S5 or 1775-SR5 module. You cannot use this function with a 1775-S4A. You must be in run mode; you cannot use this function with the processor in program mode.

Use the LIST function to set up the channel to which you want to be connected, e.g., for the 1775-GA, set communications for IT defaults. Make the module connection and begin.

Contact history lets you monitor the value stored in a word or the state of a bit. You can monitor any data table address except as noted below. The status of the bit(s), on or off, and length of time the bit(s) remained on or off is displayed in hours, minutes, seconds and hundredths of a second.

For example, you can use the contact history function to monitor the done bit in a block transfer instruction to check how often a block transfer occurs.

Addresses You Can Monitor

You can monitor one address at a time. You cannot monitor a pointer address, a floating point address nor a higher-order integer address. You cannot monitor a logical address with an indirect file or indirect offset.

Bit Mask

The software actually monitors an entire 16-bit word. You specify a bit mask showing which bits to ignore and which to monitor (0 means ignore and 1 means monitor). Each hundredth of a second, the software checks the monitored bit(s). If any have changed, the data word (with all ignored bits cleared) is recorded in a histogram buffer along with the time since the last value was recorded (in hundredths of a second).

If the mask has only one bit set to 1, only one data bit is being monitored, so the data is displayed as ON or OFF. If the mask has more than one bit set to 1, the data is displayed as 16-bit binary numbers with the ignored bits blanked out.

Note: Masks cannot be cleared or set when monitoring a bit address.

If no mask is used, all bits are recorded and the data is displayed in decimal or binary, depending on the type of data.

Writing to Disk

You can send data to hard disk and use it to generate and print a contact histogram report. The file is <name>.HIS in the IPDS\NIS\PLC3 directory. If that file already exists, you are asked if the old data should be overwritten, if the file should be appended with new data or if you want to select another name.

Important: Keep track of the monitoring process if you use this option. It continues to fill hard disk space until only 10kbytes remain, when it will display a warning message.

Contact History Display

When you press [F6] - **Contact History** from the General Utilities display and [F1] to start, the Contact History display begins. You can view the display at your terminal or print a hard copy.

CONTACT HISTOGRAM for		T1 with mask NONE
accumulated time	delta time	data
00:22:40.25	00:00:00.09	49408
00:22:40.35	00:00:00.10	49424
00:22:40.44	00:00:00.09	49440
00:22:40.53	00:00:00.09	49456
00:22:40.63	00:00:00.10	49408
00:22:40.72	00:00:00.09	49424
00:22:40.81	00:00:00.09	49440
00:22:40.91	00:00:00.10	49456
00:22:41.00	00:00:00.09	49408
00:22:41.10	00:00:00.10	49424
00:22:41.19	00:00:00.09	49440
00:22:41.29	00:00:00.10	49456
00:22:41.38	00:00:00.09	49408
00:22:41.47	00:00:00.09	49424
00:22:41.57	00:00:00.10	49440
00:22:41.66	00:00:00.09	49456

Press a key for desired histogram function.

PROGRAM		Hist:	Started	Mode:	Contin	Disk	Recording	Off	Direct	Connect
START	STOP	CONTINUE	PAGED	NEW	NEW	CLEAR	WRITE	NEXT	PREV	
HISTORY	HISTORY	MODE	MODE	MASK	ADDR	MASK	TO DISK	PAGE	PAGE	
F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	

At the top is displayed the address being monitored, along with the mask. A status line showing processor mode, monitoring state (running or stopped), display mode (paged or continuous), whether or not the data is being written to the hard disk, and the processor Data Highway Plus address.

When the histogram is running, data appears under the following headings. Accumulated time is the total elapsed monitoring time. Delta time is the length of time the bit remained in one state. Under "Data" appears the on or off status of the bit.

The terminal can display up to 16 lines of data at one time. In continuous mode, the screen scrolls, showing the most recent data at the bottom of the screen. In paged mode, 16 lines fill the screen and stop. Subsequent data is stored in a buffer until you press [F2] Stop Histogram. You can view the data by pressing the next/previous page keys.

Here are the function keys you can use from the Contact History display:

Key:	Function:
[F1] - Start History	Begins monitoring the address.
[F2] - Stop History	Stops monitoring the address.
[F3] - Continuous Mode	The screen automatically scrolls up, displaying new data as it is collected. If new data is generated faster than the display can be updated, eventually the data buffers will overflow and "Data Overrun" will be displayed.
[F4] - Paged Mode	Displays data one page at a time when you press Next Page or Previous Page.
[F5] - New Mask	Prompts you to enter a new bit mask in hex. You can enter a new mask while histograms are "running".
[F6] - New Address	Prompts you to enter a new address or symbol to monitor.
[F7] - Clear Mask	Clears the present bit mask. You can clear the mask while histograms are "running".
[F8] - Write to Disk	Copies the data to a file on the hard disk
[F9] - Next Page	Displays the next page of data (if any) when in paged display mode.
[F10] - Previous Page	Displays the previous page of data (if any) when in paged display mode.
[ALT] [E]	Displays the Configure Display screen. When symbol display is turned on, the symbol name is displayed on the screen and written to disk.

Chapter Objectives

In this chapter, you will read about creating and editing Data Highway and Report Generation messages.

The software does not require the edit resource to edit messages, but the T4 does require the edit resource.

Data Highway and Report Generation Messages

You can create, edit, copy, and delete Data Highway and Report Generation messages using a full-screen text editor. For more information on the uses of these types of messages, see these publications:

Message Type	Publication Number
Report Generation	1775-6.5.4
Data Highway	1775-6.5.1

Follow these steps to use the Message utility.

1. Press **[F7]** - **GENERAL UTILITY** in the monitor program display. You see the General Utilities function keys.
2. Press **[F5]** - **MESSAGE EDIT**. You see the Select Message Type function keys.
3. Select the type of message you want, **[F1]** **Report Gen** or **[F4]** **Data Highway**. The Main Message display appears:

REPORT GENERATION MESSAGE PROCEDURES		
PROCEDURE NAME	PROCEDURE SCOPE	MESSAGE NUMBER
@FORCELST	LOCAL	0
@MSGPRINT	LOCAL	1
@SAVE_ASC	LOCAL	2
@STAT_CAL	LOCAL	3

Press a key for desired message function.

PROGRAM			memory	UNPROTECTED	Direct	Connect
EDIT	DELETE	COPY		SELECT	NEXT	PREV
				FILE	PAGE	PAGE
F1	F2	F3		F5	F9	F10

In our example, the report generation procedures listed could be executed by the 1775-GA or the 1775-S4B module, and reside in PLC-3 processor memory at the extended address:

E5.<context#>.1.<message#>.<word#>

Data Highway procedures (messages) are executed by the 1775-KA module, and reside in processor memory at the extended address:

E5.<context#>.4.<message#>.<word#>.

The display also lists the scope of each procedure (local or global) and the message number (address) of each procedure. Whenever you enter the name of a procedure, you do not have to include the @ sign in front of the procedure name. The software will automatically include the @ sign. Procedure names may contain eight characters or less, not counting the @ sign. The first character must be A-Z, upper or lower case. Valid characters in a procedure name include A-Z, a-z, 0-9, and _ (underscore).

These six function keys appear in the display:

F1 - EDIT prompts you for the name of the procedure you want to edit and calls up the text editor (described later) for the selected procedure. You can specify the scope of new procedures by adding /L (for local) or /G (for global) to the end of the procedure name. The default scope is local.

F2 - DELETE prompts you for the name of the procedure you want to delete (discussed later). When you use this function, the entire procedure is deleted and is not retrievable.

F3 - COPY prompts you for the name of the procedure you want to copy and then prompts you for the name of the procedure that will receive the copy. After you select the names using the cursor keys or by typing the names, the copy begins. If both procedures already exist, the Copy display will appear (described later). You can specify the scope of new procedures that will receive the copy by adding /L (for local) or /G (for global) to the end of the procedure name. The default scope is local.

F5 - SELECT FILE to work with a procedure stored on disk. When you press [F5], the Select File display appears (described later).

F9 - NEXT PAGE and **F10 - PREV PAGE** move the cursor by page through the list of procedures.

You can select procedures in two ways, by placing the cursor on the procedure and pressing [ENTER], or by typing the name of the procedure and pressing [ENTER]. You can search for a procedure in the list of procedures by typing enough characters to uniquely identify the procedure and pressing [ENTER]. You select a disk file by pressing F5 - Select File (see "Selecting a File").

Editing a Message

You edit messages in the processor and messages stored on disk using the text editor resident in the software. A given message can contain up to 32,767 words of processor memory or 700 lines of text, whichever limit is reached first. There can be up to 32,767 message files.

If the message is in the processor, press [F1] in the Main Message Display. You are prompted for the procedure name. Select it from the Procedure Names listed in the Main Message display, or enter a new name if you want to create a new procedure, then press [ENTER]. You see the text editor display.

If the message is on disk, press [F5] in the Main Message display. The Select File appears and you can select the file from procedures listed in the Select File Display. (Press [F1], then select or enter a file name. You see the text editor display.)

```
INQ A 'ENTER A VALUE:\X'
P 'SELECTOR SWITCH A IS' (&I:12/10):!L
LOGICAL1==? 'CLOSED'
LOGICAL0==? 'OPRN'
P 'THE STORAGE VALUE IS' (&I0:0/2):!L
P 'TEST THE PROCEDURE'
```

Enter message text.

PROGRAM		Edit Mode: Insert				Col: 1	Line: 7	Direct Connect
DELETE	UNDEL	DELETE	UNDEL	DELETE	UNDEL	ACCEPT/		
MESSAGE	MESSAGE	LINE	LINE	WORD	WORD	EXIT		
F1	F2	F3	F4	F5	F6	F8		

The text editor display contains the text of the message and these function keys:

F1 - DELETE MESSAGE deletes the entire message and stores it in the delete buffer. If the message is over 100 lines long, only the first 100 lines will be stored.

F2 - UNDEL MESSAGE retrieves the contents of the delete buffer.

F3 - DELETE LINE deletes the line the cursor is on from the cursor's position to the end of the line.

F4 - UNDEL LINE retrieves the last deleted line.

F5 - DELETE WORD deletes the word the cursor is on from the cursor's position to the end of the word.

F6 - UNDEL WORD retrieves the last deleted word.

F8 - ACCEPT/EXIT calls up the Accept Message display, which has these soft function keys:

- . **[F1] - SAVE TO PROC** sends the message to the processor.
- . **[F2] - SAVE TO FILE** lets you store the message on your computer's hard disk until you are ready to send the message to the processor. If the file already exists, it will be overwritten. If it does not exist, it will be created. The file name will consist of the name you gave to the procedure (without the @ sign) and the file extension .REP (for report generation) or .HWY (for Data Highway).
- . **[F3] - PROC & FILE** sends the message to the processor and to a file with the same name as the message. The file is stored in the C:\IPDS\ARCH\PLC3 directory.
- . **[F10] - CANCEL MESSAGE** cancels the message, which deletes the text of the message and returns you to the Main Message display.

In addition to the soft function keys listed above, the text editor provides these editing functions.

Keys:	Function:
[CTRL] [A]	Toggles between insert and overstrike mode. In insert mode, the character the cursor is on and any characters to the right of the cursor are shifted to the right as you type. In overstrike mode, characters you type appear at the cursor position and overwrite (i.e., delete) characters previously at the cursor's position.
[CTRL] [B]	Move the cursor to the beginning of the current line. If the cursor is at the beginning, it moves to the beginning of the previous line.
[CTRL] [D]	Same as the left arrow key.
[CTRL] [E]	Move the cursor to the end of the current line. If the cursor is at the end, it is moved to the end of the next line.
[CTRL] [F]	Same as the right arrow key.
[CTRL] [H]	Deletes one character to the left of the cursor.
[CTRL] [I]	Same as the [TAB] key.
[CTRL] [J]	Deletes the previous word.
[CTRL] [L]	Retrieves the contents of the delete buffer.
[CTRL] [M]	Same as [ENTER] key.
[CTRL] [N]	Moves the cursor to the next word.
[CTRL] [P]	Moves the cursor to the beginning of the previous word.
[CTRL] [R]	Copies highlighted text into the delete buffer.
[CTRL] [U]	Deletes from the cursor to the beginning of the current line.

[CTRL] [V]	Toggles the text selection range on and off. All selected text is highlighted on the screen.
[CTRL] [W]	Deletes highlighted text and stores it in the delete buffer.
[CTRL] [X]	Deletes the current line, regardless of cursor position in the line.
[HOME]	Moves the cursor to the beginning of the message.
[END]	Moves the cursor to the end of the message.
Arrow keys	Move the cursor one position in the appropriate direction.
[CTRL] arrow	Moves the cursor to the farthest position in the appropriate direction. If the cursor is at the top of the display, [CTRL] up arrow functions as a "page up" key. If the cursor is at the bottom of the display, [CTRL] down arrow functions as a "page down" key.

Use the function keys and editing keys to enter or edit the message.

Deleting a Message

Follow these steps to delete a message.

1. Press **[F2] DELETE**, in the Main Message display. You are prompted to enter the procedure name you want to delete.
2. Select the procedure you want to delete by placing the cursor on the procedure name or by entering the name, then press **[ENTER]**. The entire procedure is deleted and is not retrievable.

Copying a Message

Follow these steps to copy a message.

- 1. Press [F3] COPY, in the Main Message display. You are prompted to enter the procedure name to copy FROM.
- 2. Enter the procedure you want to copy from and press [ENTER]. You are prompted to enter the procedure name to copy TO.
- 3. Enter the procedure name you want to copy to and press [ENTER]. You can specify the scope of the procedure by adding /G (for global). The default scope is local. The copy takes place. When the copy is complete, the procedure name will be stored in section 6 (System Symbols) of PLC-3 memory, and a message file will be created and stored in section 5 (Messages) of PLC-3 memory.

If the procedure name to be copied TO already exists, the Copy display appears.

REPORT GENERATION MESSAGE PROCEDURES

PROCEDURE NAME	PROCEDURE SCOPE	MESSAGE NUMBER
@FORCELIST	LOCAL	0
@MSGPRINT	LOCAL	1
@SAVE_ASC	LOCAL	2
@STAT_CAL	LOCAL	3
@SYST4N	LOCAL	4

@ SIGN ADDED TO PROCEDURE NAME.
Press a key for desired copy function.

PROGRAM

memory UNPROTECTED

Direct Connect

OVRWRT APPEND

CANCEL

MESSAGE MESSAGE

COPY

F1

F2

F10

Press F1 - OVRWRT MESSAGE to overwrite the existing message.

Press F2 - APPEND MESSAGE to append the copy to the existing message.

Press F10 - CANCEL COPY to cancel the copy and return to the Main Message Display.

Selecting a File

If a message did not fit into the processor, or if a message was incomplete, you may have saved the message in a disk file. This section tells you how to manipulate messages you have already stored on disk file.

Follow these steps to manipulate messages stored in disk files.

1. Press **F5 SELECT FILE**, in the Main Message display. The Select File display appears.

```

----- REPORT GENERATION MESSAGE PROCEDURES -----
----- PROCEDURE FILE(S) -----
@FORCELST
@MSGPRINT
@SAVE_ASC
@STAT_CAL
  
```

Press a key for desired restore function.

PROGRAM		memory UNPROTECTED		Direct Connect
EDIT	DELETE	RESTORE	NEXT	PREV
FILE	FILE	TO PROC	PAGE	PAGE
F1	F2	F5	F9	F10

F1 - EDIT FILE prompts you for the name of the file you want to edit. Enter the file name of an existing file and press [ENTER]. The text editor display will appear (described earlier). You can select files in two ways, by placing the cursor on the file and pressing [ENTER], or by typing the name of the file and pressing [ENTER]. You can search for a file in the list by typing enough characters to uniquely identify the procedure and pressing [ENTER].

F2 - DELETE FILE prompts you for the name of the file you want to delete. Enter the file name and press [ENTER]. The file is deleted from the disk.

Chapter Objectives

In this chapter, we will show you how to:

- . save
- . restore
- . compare

memory between the processor and data cartridge tapes or disk files.

IMPORTANT: Before you use Save/Restore, set channel timeouts to 0 on the channel that you are communicating through.

Terms Used in this Chapter

In this chapter we refer to physical and logical memory. When we use these terms we mean:

physical memory, - the **entire** memory image as it appears in and is used by the PLC-3 processor (sometimes called GA format)

logical memory - memory representation structured to make it easier for the user to read and assign memory addresses. Using logical format, you can save the entire PLC-3 memory or sections of it.

When you're saving to tape or file, you are asked to enter an SB-tape name and SB-file name. This means the tape and file names you assign to sections of the 1770-SB tape. SAVEs to tape/disk use the same format so they can be transferred back and forth. Here are definitions for these terms:

Disk File - the name of your disk file. There are seven types of disk files: ASCII, comments and symbols, cross reference, database, documentation report, exported comments and symbols, and user configuration. This name can be up to 8 characters in length.

SB-tape name - a description you enter to describe the entire contents of the tape or archive file. This name is the 60-character name you supply when you're prompted for tape name when you use this software. If you are restoring a file saved from another device or saving directly to 1770-SB cartridge, up to 60 characters of the disk/tape file name are displayed.

SB-file name - a description you enter to describe a section of a tape or archive file. The description can contain up to 60 characters. If you save memory in separate sections, you will enter an SB-file name for each section.

Next we provide the rules for naming your disk file, SB-file name and SB-tape name.

File Names

The **file name** can be composed of the following characters, with no spaces, starting with a letter:

- . letters A - Z (both upper and lower case)
- . numbers 0 - 9
- . underscore character _

The software will automatically append file extension .ARC, .PHY or .ACH to the end of the file name.

Illegal File Names

ASSEMBLY.LAD
Motor*1
Conveyor__1
123

Reason

no file type allowed (.LAD)
* character is not allowed
more than 8 characters
must start with a letter

Legal File Names

Program1
HOPS__MIX
AT101

We cover the **function keys** you can select from the Save/Restore in the order of save, then restore, and last, compare. But before doing so, let's discuss the cursor keys you can use while in the Save/Restore menu.

Cursor Keys

You can use the following keys to display and select files. Not all of the function keys are available for every task.

Key	Function
[HOME]	Moves the cursor to the first file and highlights it
[END]	Moves the cursor to the last file and highlights it
Up/Down Arrow	Move the cursor up or down to the next file and highlights it

Save/Restore

The Save/Restore function allows you to perform these actions on all or part of processor memory:

- save all or part of processor memory to cartridge tape [F1] or hard disk file [F2]
- restore all or part of processor memory from cartridge tape [F3] or hard disk file [F4] to the processor
- compare processor memory to memory stored on cartridge tape [F5] or hard disk file [F6]

Memory saved to the hard disk resides in the IPDS\ARCH\PLC3 directory.

To get to the Save/Restore menu, select:

- [F1] - Online Prg/Doc (from the top menu)
- [F2] - Save/Restore (from the 2nd menu)

Here is the display you see.

PLC-3 PROGRAMMING SOFTWARE						[ONLINE]
RUNNING CONTEXT	CONTEXT NAME	DATA TABLE	PROGRAM	MESSAGE	TOTAL	
1	STATION6	624	54	0	679	

Press a key.

RUN	Save	Save	Restore	Restore	Mem: Unprotected	Compare	Compare	Dir
	to Tape	to File	fr Tape	fr File	to Tape	to File	Display	
	F1	F2	F3	F4	F5	F6	F7	

PLC-3 Direct

Now we'll cover the function keys you can select from the Save/Restore menu in the order of save, restore, compare, and last, transfer.

Save

The most common use of Save is when you want to save changes to your program. The quickest way to save your program is to do a Save Physical or Save Context. We discuss both of these functions in this section.

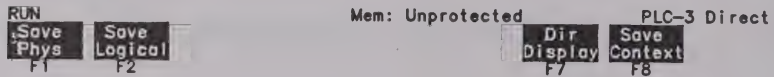
You can save processor memory as a physical image, a logical image, or a single context.

Press [F1] to save PLC-3 memory to a tape.

Press [F2] to save to disk file. This is the display you will see:

PLC-3 PROGRAMMING SOFTWARE						[ONLINE]
RUNNING CONTEXT	CONTEXT NAME	DATA TABLE	PROGRAM	MESSAGE	TOTAL	
1	STATION6	624	54	0	679	

Press a key.



Save to Tape [F1] Save to File [F2]

You have these Save options:

[F1] Save Physical is a full save. It is the quickest way to save PLC-3 memory.

[F2] Save Logical is a full or partial save (logical format) of PLC-3 memory. This method lets you save all or a part of memory.

[F7] Directory Display lists the files in your directory.

[F8] Save Context is the logical save that saves the entire context (E3-E10) on which your cursor is positioned. This is the format that should be used when preparing to convert the file for offline editing.

Miscellaneous functions on this menu that you can invoke are:

[F7 Display Directory shows all the contexts you have in PLC-3 memory.

Page Up, Page Down keys show more contexts if they exist.

We cover Save Physical and Logical next.

Save Physical [F1]

When you select [F1] Save Physical, you are saving all of PLC-3 memory. You need privilege 0 for direct connect upload privilege on Data Highway Plus. When you save a file, you are prompted for the name of the file you want to save. Here is the display you see:

PLC-3 PROGRAMMING SOFTWARE						[ONLINE]
RUNNING CONTEXT	CONTEXT	NAME	DATA TABLE	PROGRAM	MESSAGE	TOTAL
1	STATIONS	624	54	0	679	

FILE

File Name:

Press a Function Key or Enter a File Name.

> RUN

Begin Oper

F1

Mem: Unprotected

Define Dir

F7

PLC-3 Direct

Archive Dir

F10

Save Physical screen

To see the files in the archive directory, use function key [F10] Archive Directory.

Type the file name and press [Enter]. Press [F1] and you will see this screen:

MEMORY SAVE

From: PLC-3 Processor Memory
To: Disk File - STATION6.PHY
SB-Tape Name: STATION6

Select function or <ENTER>.

Return
to Menu
F3

Press [Enter] to start the save and you will see this screen:

ALLEN-BRADLEY CO.
6200 SERIES SOFTWARE
PLC-3 MEMORY SAVE UTILITY

Processor is in RUN Mode. Data Table values may be changing during SAVE.
WARNING: After RESTORE processor will Restart in PROGRAM LOAD mode.
Press <ENTER> to Continue, <ESC> to CANCEL.

Processor is in RUN Mode.

Press Control_Z to Abort

Press [Enter] to continue, [Esc] to cancel or [Ctrl]
[Z] to abort.

Save Logical [F2]

PLC-3 memory that is accessible for you to logically save, restore, or compare is in these areas of PLC-3 memory, in logical format:

- . Area 2 (module status), in blocks except E2.0, E2.1, E2.2, E2.14, E2.15, and subsections that have a 0 at the fourth level of the address (such as E2.3.1.0).
- . Area 3 (data table)
- . Area 4 (user program)
- . Area 5 (messages)
- . Area 6 (system symbols)
- . Area 8 (converted GA procedures)
- . Area 10 (force tables)

You can logically save E3 through E10 for one or all contexts, save E2 separately, or save any combination of memory sections (but you must save them one at a time).

When you press the [F2] Save Logical function key, you are prompted for a file name. This chart explains what you do.

	Save to File	Save to Tape
Disk File	Enter file name	No entry
SB-Tape Name	Assigned	Enter tape name
SB-File Name	Enter file name	Enter file name

When you type in your file name, press [Enter]. Press [F1] - Begin Operation. You will see this screen:

MEMORY SAVE

From: PLC-3 Processor Memory

To: Disk File - STATION6.ARC

SB-Tape Name: STATION6

SB-File Name:

Select function or <ENTER>.

SB-File Name	Return to Menu
F2	F3

Press [F2] and enter the SB filename. Press [Enter] until you see this display:

```

                                MEMORY SAVE

From: PLC-3 Processor Memory
To: Disk File - STATION6.ARC
SB-Tape Name: STATION6
SB-File Name: STAT6
Memory To Save:
      Context      Major Section(s)
      -----
      ALL          E3 - E10
  
```

Press a function key or press <ENTER> to begin.

Single Context	Module Status	Extend Address
F1	F2	F5

From this display you can select:

- [F1] Single Context allows you to save all or partial areas of memory in a context
- [F2] Module Status allows you to save memory area E2
- [F5] Extended Address allows you to save memory beginning at a specified extended addresses. Press [F1] to enter the starting address.

Next we cover the choices you have when you select Single Context because there are many options from which you can choose. We do not cover Module Status or Extended Address menus because these are very straight forward and are explained above.

Single Context [F1]

When you select [F1] Single Context, you see this display.

```

                                MEMORY SAVE

From: PLC-3 Processor Memory
To: Disk File - STATION6.ARC
SB-Tape Name: STATION6
SB-File Name: STAT6
Memory To Save:

  Context      Major Section(s)
  -----
    1          E3 - E10
  
```

Press a function key or press <ENTER> to begin.

Select Context F1	Data Table F3	User Program F4	Message F5	System Symbols F6	Convrt'd Procdrs F7	Force Table F8
-------------------------	---------------------	-----------------------	---------------	-------------------------	---------------------------	----------------------

Select Context [F1]

If you want to save the current context (shown in the display under "Memory To Save:") and areas of memory E3-E10 (default is all), press the [Enter] key twice and the current context and areas of memory are saved. Or you can select a specific context. This function is [F1] Select Context. If you want to save another context, select the context and areas of memory you want to save, then name your file. Press [Enter] until you see this display:

```

+-----+
|                ALLEN-BRADLEY CO.                |
|                6200 SERIES SOFTWARE              |
|                PLC-3 MEMORY SAVE UTILITY          |
+-----+
From: PLC-3 Processor Memory      To: Disk File - STATION6.ARC
SB-Tape Name: STATION6           Starting Address: E3
SB-File Name: STAT6              Current Address: E10.1.2

+-----+
| Processor is in RUN Mode. |
| PLC-3 Memory Section Has Been Saved |
| PLC-3 Memory Section Has Been Saved |
| PLC-3 Memory Section Has Been Saved |
| PLC-3 Memory Section Has Been Saved |
| PLC-3 Memory Section Has Been Saved |
| PLC-3 Memory Section Has Been Saved |
+-----+
PRESS ANY KEY TO CONTINUE.
  
```

If you want to select a specific area of memory within a context, you use one of the other function keys we discuss next.

Data Table [F3]

Press [F3] Data Table and then [Enter] if you want to save the entire data table. When you select this option, there are two menus from which you can select the part of the data table you want to save. For some areas of the data table, you can select a specific file you want to save. Here is an example of a display you see if you select the output image table of the data table:

MEMORY SAVE

From: PLC-3 Processor Memory

To: Disk File - STAT6.ARC

SB-Tape Name: STAT6

SB-File Name: STAT6

Memory To Save:

Context	Major Section(s)	Section	FILE
1	Data Table	Output Image	ALL

Press a function key or press <ENTER> to begin.

Output Image F1	Input Image F2	Timers F3	Countrs F4	Integer F5	Float Point F6	File F8	Next Page F10
--------------------	-------------------	--------------	---------------	---------------	-------------------	------------	------------------

If you go to the next data table menu (use [F10]) and select ASCII, here is the display you see:

MEMORY SAVE

From: PLC-3 Processor Memory

To: Disk File - STAT6.ARC

SB-Tape Name: STAT6

SB-File Name: STAT6

Memory To Save:

Context	Major Section(s)	Section	FILE
1	Data Table	ASCII	ALL

Press a function key or press <ENTER> to begin.

Decimal F1	Binary F2	ASCII F3	High Integer F4	Pointer F5	Status F6	File F8	Prev Page F10
---------------	--------------	-------------	--------------------	---------------	--------------	------------	------------------

User Program [F4]

When you select [F4] - User Program, then [Enter], you save the entire ladder program. There is another menu from which you can select a portion of the program you want to save: main, subroutine, fault. Here is the display you see:

MEMORY SAVE

From: PLC-3 Processor Memory

To: Disk File - STAT6.ARC

SB-Tape Name: STAT6

SB-File Name: STAT6

Memory To Save:

Context	Major Section(s)	Section
1	User Program	ALL

Press a function key or press <ENTER> to begin.

Main	Subrtn	Fault
F1	F2	F3

Once you specify which portion of your program to be saved (by pressing [F1], [F2], or [F3]), you can also specify starting and ending rungs within that portion. Here is the display you see:

MEMORY SAVE

From: PLC-3 Processor Memory

To: Disk File - STAT4.ARC

SB-Tape Name: STAT4

SB-File Name: STAT4

Memory To Save:

Context	Major Section(s)	Section	RUNG(S)
1	User Program	Main	ALL

Press a function key or press <ENTER> to begin.

Main	Subrtn	Fault	Start Rung	End Rung
F1	F2	F3	F7	F8

Messages [F5]

When you save or restore messages, memory areas E5 and E6 should be saved or restored together. You should do this because messages are stored in memory area E5 and procedure names for messages are stored in memory area E6.

To save or restore messages, select [F5] Messages and press [Enter] to save all of the messages in this area of memory. If you only want to save specific messages, you can select Report Generation, Comments, Macros, Data Highway, Help and Message Number. Here is the menu:

MEMORY SAVE

From: PLC-3 Processor Memory

To: Disk File - STAT6.ARC

SB-Tape Name: STAT6

SB-File Name: STAT6

Memory To Save:

Context	Major Section(s)	Section
1	Messages	ALL

Press a function key or press <ENTER> to begin.

Report Gen F1	Comment F2	Macros F3	Data Highway F4	Help F5	Message Number F8
---------------------	---------------	--------------	-----------------------	------------	-------------------------

System Symbols [F6]

You use functions [F6], [F7] and [F8] to save all of the system symbols, or all of the converted procedures, or all of the force tables.

Converted Procedures [F7]

When you make one of these selections, everything that resides in these areas of memory is saved.

Force Table [F8]

Note: When you are at various levels of a logical save, the [HOME] key allows you to return to the SB file screen.

Save Context

Select [F8] Save Context (from the Save to Tape or Save to File menus) to save areas E3-E10 of a context. This is the format that should be used when preparing to convert the file for offline editing.

When you press [F8], this display appears on the screen. Note that the software assigns the program name to the SB-tape name and SB-file name.

ALLEN-BRADLEY CO.
6200 SERIES SOFTWARE
PLC-3 MEMORY SAVE UTILITY

Processor is in RUN Mode. Data Table values may be changing during SAVE.

Press <ENTER> to Continue, <ESC> to CANCEL.

Processor is in RUN Mode.

Press Control_Z to Abort

If you want to save areas E3-E10 for the context the cursor is on, press [Enter] and the context is saved. Here is an example of this display:

ALLEN-BRADLEY CO.
6200 SERIES SOFTWARE
PLC-3 MEMORY SAVE UTILITY

From: PLC-3 Processor Memory
SB-Tape Name: STATION6
SB-File Name: STATION6

To: Disk File - STATION6.ACH
Starting Address: E3.1
Current Address: F10.1.2

```
Processor is in RUN Mode.
PLC-3 Memory Section Has Been Saved
PLC-3 Memory Section Has Been Saved
PLC-3 Memory Section Has Been Saved
PLC-3 Memory Section Has Been Saved
PLC-3 Memory Section Has Been Saved
PLC-3 Memory Section Has Been Saved
```

PRESS ANY KEY TO CONTINUE.

If, however, you want to save a context other than the one on which the cursor is, escape to the 2nd menu and select [F7] Directory Display to see other contexts. Cursor to the context you want. Then select [F8] Save Context and the save automatically begins. When the context is saved, press any key to return to the 2nd menu.

Restore

Before you use restore, read this:

WARNING: Before you use the restore function, make sure the processor is in program mode. Using restore while the processor is in run or test mode could result in injury to personnel or equipment.

You can restore saved memory to any PLC-3 processor, as long as memory section E2 was not included, or the save was physical. If memory area E2 was included in the save, you must restore to the same processor configuration from which you saved.

When restoring a file that was saved with the Save Context format, the program is restored to the monitoring context, i.e., the context the cursor is on when you select the restore option.

When you restore a program from an .ACH file, to make sure the program being restored will fit in the processor:

$$\text{K words PLC-3 memory required to restore a program} \\ = \frac{\text{ACH file size in bytes}}{2048}$$

If you are restoring a physical image over Data Highway Plus, you must have privilege 72, download privilege.

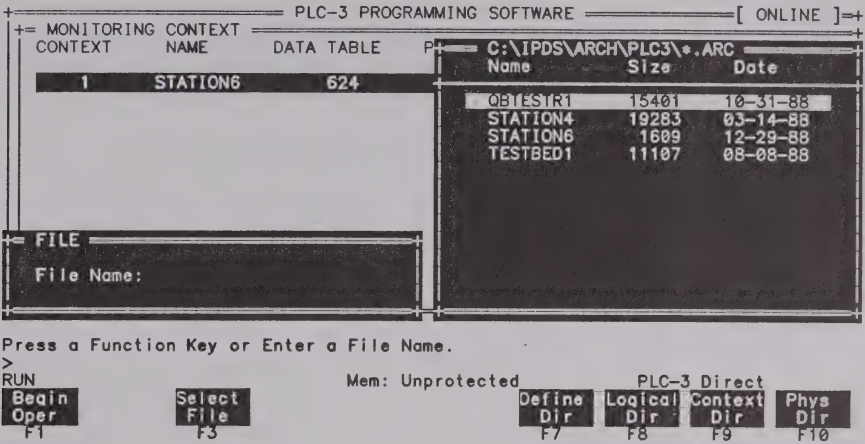
Note: If E10 was saved, forces are enabled in the processor when the save occurs, then forces are enabled after the restore.

Restore from Tape [F3] Restore from File [F4]

Press [F3] Restore from Tape or [F4] Restore from File to restore PLC-3 memory to the processor.

1. To restore from tape, press [F3] and continue with step 2 of these instructions.
2. To restore from PLC-3 memory, press [F4].

The system displays the following screen:



Restore from File screen

From the directory of files displayed on the right of the screen, you can either:

- Type a file name from the directory and press [Enter], or
- Use your cursor keys to scroll to the file you want, and select [F3] Select File.

2. Press [F1] - Begin Operation.

The display then changes to this:

MEMORY RESTORE

From: Disk File - STATION6.ARC
To: PLC-3 Processor Memory
SB-Tape Name: STATION6
SB-File Name: STAT6
Restore Mode: APPEND-NO

Press a function key or press <ENTER> to begin.

Append Y/N F1

Next SB-File F2

Return to Menu F3

You have the option to append this file. Select [F1] for restore mode.

Append deals only with the User Program section of PLC-3 memory. Data table is overwritten if it already exists in the processor. Remember,

E2 is always overwritten
 E3 is always overwritten
 E4 is overwritten or appended
 E5 is always overwritten
 E6 is always overwritten
 E8 is always overwritten
 E10 is always overwritten

NOTE: Data in the processor remains unchanged for the addresses that do not exist in the restore file.

Compare

You can compare processor memory to processor memory stored on cartridge tape or disk file. When you select compare to file, this menu is displayed:

PLC-3 PROGRAMMING SOFTWARE [ONLINE]

MONITORING CONTEXT			C:\IPDS\ARCH\PLC3*.ARC		
CONTEXT	NAME	DATA TABLE	Name	Size	Date
1	STATION6	624	OBJESTR1	15401	10-31-88
			STATION4	19283	03-14-88
			STATION6	1609	12-29-88
			TESTBED1	11107	08-08-88

FILE

File Name:

Press a Function Key or Enter a File Name.

>

RUN Mem: Unprotected

Begin Oper F1	Select File F3	Define Dir F7	PLC-3 Direct Logical Dir F8	Context Dir F9
------------------	-------------------	------------------	-----------------------------------	-------------------

When you compare tape to processor memory, you must enter the .LOG file name. When you compare archive file to processor, the log file takes the same name as the archive file. The .LOG file lists the differences between the tape and processor memory, or between your file and processor memory. The software automatically assigns the extension .LOG to the log file.

**Compare to Tape [F5]
Compare to File [F6]**

1. Select which compare you want to make and press [F5] or [F6].
2. If you are doing a disk compare, select the file you want to compare with PLC-3 memory in one of two ways:
 - cursor to the file you want and press [F3]
 - or
 - enter the file name at the prompt and press [F3]
3. Press [F1] - Begin Operation.
4. If you want to: Press:

Begin the compare	[Enter]
Select the next file on your tape or disk	[F2]
Return to 2nd Menu	[F3]

The Compare Status display begins listing the results of the comparison. Results are stored in the file you name with the extension .LOG.

5. Press [Enter] when the compare is complete. You can now:
 - List the first archive file on disk, or rewind the tape by pressing [F5]
 - or
 - Return to the 2nd menu by pressing [F3].

The log file lists the differences between PLC-3 memory and the tape/disk file. It displays:

- . source of comparison
- . reference (always processor memory)
- . tape name
- . file name

To view the results in the .LOG file:

1. Exit the software returning to DOS. Use function key [F10] on the top menu to exit.
2. Use you text editor or DOS "Type" command to see the .LOG file. The command is:

CD C:\IPDS\LIS\PLC3

3. Enter:

TYPE FILE NAME.LOG

The results of the compare are displayed. If you want hard copy, use the [F8] Print Report function key from the top menu.

Transfer

Refer to Chapter 23, 2.0 File Option Changes, for information about transferring files.

Chapter Objectives

In this chapter, you will read about how to enter and edit rung, instruction, and address comments and how to assign symbols to logical addresses. Here is some information you need to know about using the program documentation function.

- . Your documentation is stored on hard disk, not in the processor.
- . If you want to see documentation when you are monitoring a program online, you must have a computer that has the documentation file on hard disk.
- . With this software, each instruction has a main address. When displaying address comments with ladder logic, only the comment for the main address is displayed.
- . If you have more than one documentation database stored on your hard disk, the software matches the name of the database with the program name that is stored in the processor. This is how the software knows which documentation goes with your program. The program name is stored in the processor at address E3.X.14.0.0.0, where X is the context.

Rules and Conventions

Comment Type:	Size:	Assigned to:
Rung	6 lines, 80 characters	rightmost first level output instruction and the main address of this instruction
Instruction	5 lines, 10 characters	the instruction and its main address
Address	5 lines, 10 characters/line	address

Note: The main address for each multi-address instruction is listed at the end of this chapter.

1. You can only enter a rung comment after the rung contains an output instruction.
2. Rung comments are associated with the rightmost first level output instruction **and** the main address of this instruction. **They are not tied to the rung.** Therefore, if the same output instruction (and address) is used more than once in the program. The associated rung comment will appear at every occurrence of that output instruction. This will not happen if 1) the same address is used for different output instructions or 2) the same instruction is used with different addresses. For example:

O0:11	O0:11	O0:11
--()--	--(U)--	--(L)--
01	01	01

could all have different rung comments because they are different instructions (OTE, OTU, OTL), even though they share the same address.

3. Address comments can be assigned to all addresses except extended addresses. However, for multi-address instructions, only the comment for the main address will be displayed with the ladder logic on the screen and in the program listing.
4. Instruction comments take precedence over address comments on the screen display and in the program listing.
5. [F9] - Next Comment will not advance past the END OF PROGRAM rung and will not wrap to the top of the program. Similarly, [F9] - Previous Comment will not back up past the first rung, nor will it wrap to the bottom of the program. You cannot move off the cursored rung until it is "Accepted" from the rung editing mode.
6. You cannot assign a comment to an MVS instruction if the destination address of the instruction is an extended address.
7. You can enter address comments from Data Monitor by pressing [ALT] [T].
8. You cannot assign instruction, address or rung comments to RET, NOP and MCR instructions, or to LBLs without a label number.

Buffers

The software contains temporary storage areas called buffers (1 buffer for rung comments and one buffer for both instruction **and** address comments). The comment buffers allow you to temporarily store the last deleted instruction, address, or rung comment. The term "last deleted" means that each (rung, address, and instruction comment) buffer only stores one comment (per buffer) at a time.

For example, if the instruction comment buffer contains a previously deleted XIC instruction comment and you deleted an XIO instruction comment, the XIO comment overwrites the XIC comment in the buffer. The XIO comment now becomes the "last deleted" comment and is the only comment retained in the instruction comment buffer.

Symbols

This portion of program documentation allows you to assign symbols or "tags" to data table addresses. A symbol is a 10-character ASCII string that can be associated with, and used interchangeably with, a PLC-3 logical address.

For example, you could assign the symbol "LS_1" to the input address "I0:0/01", indicating that this input corresponds to "Limit Switch #1". Using symbols can be helpful in reading cross reference reports. Think of symbols as "mini address comments". After you enter a symbol, you can always use it in place of an address (e.g., you can search for a symbol).

A symbol can contain up to 10 characters; A-Z, a-z, 0-9, and the underscore character are all valid characters.

Note: You cannot assign a symbol to an extended address.

Pressing [F6] - Modify Symbol prompts you to enter a symbol for the first address in the censored instruction. The following pertains to multi-address block instructions.

- pressing [ENTER] accepts the new symbol and moves the cursor to the next address/symbol in the instruction. If the cursor is on the last address of the instruction, you are returned to the documentation display.
- the down and up arrow keys accepts the cursored symbol and moves to the next/previous address in the instruction.
- pressing [F9]/[F10] - Next/Previous Address accepts the new symbol and moves the cursor to the next/previous instruction.

[F7] - Remove Symbol de-assigns a symbol from the cursored instruction.

Using the Database Editor

The database editor provides access to all the comments and symbols for a processor memory file. The database stores program documentation separately from the program logic. With the database editor, you can modify, delete, or insert addresses, symbols, and comments into the database.

The database editor does not contain instruction or address comments that are associated with label numbers or subroutine file numbers.

To use the database editor, do the following:

- Start on the Programming Documentation screen.
- Press [F5] - Edit Database.

The system displays the Database Edit.

Address: 0:013/10 Symbol:	Adr Cmt This is an address comment	OTE Cmt This is an output instruct.
Rung Comment Instruction: OTE		

This is a rung comment for multiple nested branches

Press a function key, enter new address or existing symbol.

Rem Prog	DBase	Create	Log addr	Search	Modify	Modify	Remove	PLC-3	Addr 30
Delete	DBASE	Create	Log addr	Search	Modify	Modify	Remove	Display	Next
Entry	Mode	X-Ref	DBASE	Address	Symbol	Symbol	Symbol	X-Ref	Prev
F1	F2	F3	F4	F5	F6	F7	F8	F9	F10

The Database Edit screen contains four windows, each for a different type of database information. These types are:

- . Addresses and symbols (default)
 - . Address comments
 - . Instruction comments
 - . Rung comments
3. Use the up and down arrow keys to move the cursor to the window for the type of information you want to modify.

The system highlights the current window with an increased intensity and double lined box. The Address/Symbol window is active when you enter the database editor.

4. Do one of the following to select the address you want to work with:
 - . Use [F9] - Next Address and [F10] - Previous Address to move through the addresses in the database.
 - . Type the address and press [ENTER].
5. Press the soft-function key for the database function you want to perform.

The soft-function keys that are available on the Database Edit screen depend on the database window you choose. The following shows the soft-function keys for Address/Symbol window.

If You Want to:	Press This Key:
Delete the current address from the database. There is no undelete function to recover information once you delete it from the database.	[F1] - Delete Entry
Select from Address, Symbol, Cross Reference Address, and Data Table Address modes.	[F2] - Database Mode
Generate or update cross reference information for the current address.	[F3] - Create Cross Reference
Search the database.	[F4] - Search Database
Change the current address.	[F5] - Modify Address
Change the current symbol.	[F6] - Modify Symbol
Remove the symbol associated with the current address.	[F7] - Remove Symbol

Display the cross reference information for the current address.

[F8] - Display Cross Reference
[ALT] [X]

Displays the next address. If the cursor is at the bottom of the database, the cursor wraps to the beginning.

[F9] - Next Address
right arrow

Display the previous address. If the cursor is at the top of the database, the cursor wraps to the end.

[F10] - Previous Address
left arrow

Address Comment Window

The keys for the Address Comment window are the same as for the Address/Symbol window, except for the following:

If You Want to:

Press This Key:

Change the current address comment.

[F5] - Modify Comment

Soft-function keys [F6] and [F7] are not active for this window.

Instruction Comment Window

The soft-function keys for this window are the same as for the Address/Symbol window, except for the following:

If You Want to:

Press This Key:

Change the current instruction comment.

[F5] - Modify Comment

Select the instruction that you want to search for in the database.

[F6] - Select Instruction

Move the cursor to the next instruction.

[F7] - Next Instruction

If you press [F6] - Select Instruction, the system displays soft-function keys that you can use to choose an address. These soft-function keys are the same as the instruction aid that the ladder editor provides for entering instructions.

To use the soft-function keys to select an address, press the key for the instruction you want or for the class of instructions that you want to display. You can also use the up and down arrow keys to move through the key selections. For more information about using the selection keys, see "Editing Ladder Programs" in Unit 5.

Rung Comment Window

The soft-function keys for the Rung Comment window are exactly the same as for the Instruction Comment window.

Choosing the Database Mode

The database address mode that you choose determines what information you want to access. The following modes are available:

Address Mode

Provides access to the rung, instruction, and address comments in the database. If you select this mode, the database editor gives you access to all the addresses that have comments, symbols, or both that are in the database. These addresses are not necessarily used by the current processor memory file.

Symbol Mode

Provides access to only the addresses that are related to symbols in the database. If you select this mode, the database editor gives you access to all the addresses in the database that have symbols related to them. These addresses are not necessarily used by the current processor memory file.

Cross Reference Mode

Provides access to the cross-reference database. If you select this mode, the database displays cross reference information for the specified data type. This information is always used in the current processor memory file.

If no cross-reference database exists, the software does not allow you to select this mode. You must first generate cross reference information.

To generate a cross-reference data table, press [F3] - Create Cross Reference.

When you switch to this mode and the current address does not exist in the cross reference database, the system displays the closest match.

Data Table Mode

Provides access to all addresses with a PLC-3 data table file. If you select this mode, the database editor displays all the addresses for a data type that exist in the data table file. This information does not include indirect addresses.

The wrap feature does not apply when you use data table mode. For example, if the current address is N7:0 and you press [F10] - Previous Address or Symbol, the system displays the following message:

DATA TABLE FILE BOUNDARY REACHED

This message means that the cursor is at the top of the data table file. Similarly, you cannot extend beyond the bottom of a data table file.

Searching the Database

To search the database, do the following:

1. Start on the Database Edit screen.
2. Press [F4] - Search Database.

The system displays the Search Database screen.

Address: 0:013/10	Adr Cmt This is an address comment	OTE Cmt This is an output instruct.
Symbol:		

_____ Rung Comment Instruction: OTE _____

```
This is a rung comment for multiple nested branches
```

Press a function key or enter search string.

Rem Prog	Dbase mode!	Log addr	Search for!	Addr/sym	PLC-3,	Addr 30
DBASE	Address	Adr Cmt	Ins Cmt	Rng Cmt	NO	NO NO
Mode	Symbol	Text	Text	Text Symbol	Adr Cmt	Ins Cmt Rng Cmt
F2	F3	F4	F5	F6 F7	F8	F9 F10

Search Database Screen

3. Type the text string for which you want to search.
4. Press a soft-function key or press [ENTER].

You can perform the following database search tasks from the Search Database screen:

If You Want to:	Press This Key:
Select from Address, Symbol, Cross Reference Address, and Data Table Address modes.	[F2] - Database Mode
Search for the specified address or symbol.	[F3] - Address/Symbol
Search for the specified address comment text.	[F4] - Address Comment Text
Search for the specified instruction comment text.	[F5] - Instruction Comment Text
Search for the specified rung comment text.	[F6] - Rung Comment Text
Search for addresses without associated symbols.	[F7] - No Symbol
Search for addresses without address comments.	[F8] - No Address Comment
Search for addresses without instruction comments.	[F9] - No Instruction Comment
Search for addresses without rung comments.	[F10] - No Rung Comment

Database Search Order

When you search the database, the editor searches for the address, symbol, or text that you specify. If the editor cannot find exactly what you specify, the editor searches for the closest match. The closest match is based on alphabetical order.

All data types are in alphabetical order, so when you specify a search for a database item, the editor follows this search order:

- . Database item equal to what you specified
- . Next database item greater than what you specified
- . Next database item less than what you specified

For example, if you search for S3:0 and that address does not exist in the database, the editor searches for the closest match that is greater than the address you specified (such as T4:0). If no address exists that is greater than S3:0, the editor then searches for the closest match that is less than the address you specified (such as N7:0).

Searching for Addresses or Symbols

If the database mode is Address and you press [F3] - Address/Symbol on the Search Database screen, you must specify an address. The database editor will not let you type a symbol.

Similarly, if the database mode is Symbol and you press [F3] - Address/Symbol, you must specify a symbol.

Note: When you search for text, the system changes the database mode to Address.

Displaying Cross References

The cross reference information shows you all the occurrences of an address in the current processor memory file. To display the cross reference information, do the following:

1. Start on the Database Edit screen.
2. Press [F8] - Display Cross Reference.

You can also press [ALT] [X] if you are on the Data Monitor screen, the Processor Status screen, or any rung-editing screen.

The system displays the Cross Reference screen.

Address: I0:2/00		Symbol:	
-I [-	M:4		
-I/I[-	M:0	M:3	M:7
-(L)-	M:6		
-(U)-	M:8		

Press a function key.

remote program
Display
Rung
F1

Page 1 of 1

PLC-3

Addr 31
Exit
X-Ref
F10

The information on this screen applies to the current address and reflects the contents of the cross reference database. If you make changes to the processor memory file and do not regenerate the cross reference database, the information on this screen is not accurate.

3. To display a particular rung, use the arrow keys to move the cursor to an address on the Cross Reference screen and then press [F1] - Display Rung.

The system displays the rung that contains the address you specified.

4. When you finish looking at the cross reference information, press [F10] - Exit Cross Reference or [ESC].

The system displays the previous screen.

You can use the following additional keys to move through the information on the Cross Reference screen:

If You Want to:	Press This Key:
Move the cursor to the first entry on the first page.	[HOME]
Move the cursor to the last entry on the last page.	[END]
Move the cursor to the next page.	[PageDown]
Move the cursor to previous page.	[PageUp]
Move the cursor to the last line on the current page.	[CTRL] [PageDown]
Move the cursor to the first line on the current page.	[CTRL] [PageUp]
Move the cursor to the beginning of the current line.	[CTRL] left arrow
Move the cursor to the end of the current line.	[CTRL] right arrow

Main Addresses

This table lists each multi-address instruction and its main address.

Instruction Mnemonic	Main Address	Instruction Mnemonic	Main Address
ADD	D	MVF	C
ADF	C	MVM	D
AND	D	MVS	D*
ANF	C	NEG	D
BIN	C	NEQ	A
BIR	C	NGF	C
BIS	C	NOT	D
BSL	C	NTF	C
BSR	C	OR	D
BTR	CB	ORF	C
BTW	CB	RES	C/T
CTD	C	RTO	T
CTU	C	SBF	C
DDT	C	SEQ	C
DIV	D	SGE	C
DVF	C	SGR	C
EQU	A	SLE	C
FBC	C	SLS	C
FFL	C	SNE	C
FFU	C	SQF	C
GEQ	A	SQR	D
GRT	A	SUB	D
LEQ	A	TOF	T
LES	A	TON	T
LIM	TEST	TOS	T
MLF	C	XIF	C
MMF	C	XIN	C
MOV	D	XOR	D
MSG	CB	XOF	C
MUL	D		

A = source A

C = control/counter

CB = control block

D = destination

T = timer

The address comment of the "main address" appears next to the instruction.

* If destination is an extended address, a comment cannot be assigned.

Chapter Objectives

In this chapter, you will read about how to generate and print reports, and configure your printer. A sample of each report discussed in this section is shown in appendix G.

Available Reports

You can generate the following reports:

- . Program Listing
- . Memory Map
- . Data Table
- . Symbol Table
- . Memory Usage
- . Cross Reference
- . Force Status
- . Unused Addresses
- . Data Highway
- . Report Generation
- . I/O Status
- . Processor Status

As you generate reports, you can print them out or save them to a file. If you need to mail these reports, it is easier to send disks than hardcopy.

Use DOS commands to transfer your reports to a floppy disk. Reports are stored in the directory:

C:\IPDS\IIS\PLC3

Samples of each report are shown in appendix G.

Reports Display

You create reports from the 2nd menu by pressing [F6] Create Reports. Here is the menu:

PLC-3 PROGRAMMING SOFTWARE						[ONLINE]
RUNNING	CONTEXT					
CONTEXT	NAME	DATA TABLE	PROGRAM	MESSAGE	TOTAL	
1	STATIONS	706	149	0	856	

Press a key .

PROGRAM				memory UNPROTECTED				Addr 53	
PROCSSR	SAVE	RETURN	CHANGE	WHO	CREATE	DIR	MONITOR	NEXT	PREV
FUNCTNS	RESTORE	TO MENU	STATION	ACTIVE	REPORTS	DISPLAY	PROGRAM	PAGE	PAGE
F1	F2	F3	F4	F5	F6	F7	F8	F9	F10

The Program Listing Options display appears. The reports you can create are shown on the right side of the screen. To select individual reports, you cursor to the report you want and press [F3] to select it. To select all reports, press [F2].

PLC-3 PROGRAMMING SOFTWARE			[ONLINE]
MONITOR CONTEXT	PROGRAM LISTING OPTIONS	DOCUMENTATION	
1	Starting Rung M:0 Ending Rung F:32767 Power Rail YES Address Comments YES Address Display SYMBOL Rung Comments YES Ladder Cross Reference ALL Save to File	3	Program Listing Cross Reference Memory Map Processor Status I/O Status Data Tables Force Status Symbol Table Unused Addresses Memory Usage Report Gen Procs Data Hwy Procs

Press a function key, or press ENTER to produce selected documents

RUN	memory UNPROTECTED					Direct Connect
	SELECT	TOGGLE	RESET	REPORT	GENERAL	TITLE
	ALL	REPORT	REPORTS	OPTIONS	OPTIONS	
	F2	F3	F4	F5	F6	F8

These are the function keys that are displayed at the bottom of your screen:

Function Key:

Function:

[F2] - Select All

Selects **all** reports listed in the "DOCUMENTATION" window at the right of the display. Selected reports are indicated by a check-mark or asterisk.

[F3] - Toggle Report

Selects the cursored report in the "DOCUMENTATION" window by displaying a check mark. Press [F3] again to remove the check mark or asterisk.

[F4] - Reset Reports

Removes all check marks from the "DOCUMENTATION" window, cancelling all selections.

[F5] - Report Options

Activates the options window for the cursored report. (See following sections.)

[F6] - General Options

Displays the "General Options" window. (See following sections.)

[F8] - Title

Displays the "Listing Title" window so you can enter a title (up to 50 characters long) for the report(s).

Report Options

When you press [F5] - Report Options, a display appears so you can select options for the cursored report. As you move the cursor/arrow, notice reports have different options and some reports have no options.

To change any information in the box in the center of the screen, select [F5] Report Options. This gives you a menu that you can use to modify report information.

The display shows the program directory, including file number, name, type and size. If formatting options exist for the cursored report, a portion of the file directory is overlaid, displaying those options.

In this section we discuss the options for each report you can select.

Program Listing

A program listing produces a printable copy of a ladder program.

Function Key:	Function:
[F1] - Rung Range	Prompts you to enter the starting and ending rung numbers of the range of rungs for report generation. You must specify the section by M, S or F preceding the rung numbers.
[F2] - Power Rail	Toggles between YES and NO to print the right power rail. Printing time and storage space are both significantly decreased if this is set to NO.
[F3] - Address Comments	Toggles between YES and NO to print address comments with the program.
[F4] - Address Display	Toggles between ADDRESS and SYMBOL. ADDRESS prints the logical addresses for all instructions. SYMBOL prints the symbols you assigned to instruction addresses. Note: Addresses are printed if no symbol exists. Addresses are shown for bit instructions in addition to symbols.
[F5] - Rung Comments	Toggles between YES and NO to print rung comments with the program.

[F6] - Ladder Cross
Reference

Toggles between OUTPUTS ONLY, ALL and NO. Cross reference information will be displayed under each rung for OUTPUTS ONLY and ALL.

- . all references are listed in database order
- . multiple occurrences of an address on a rung are displayed as a single entry.
- . extended addresses are not cross referenced.

[F9] - Save to File

Saves this configuration to disk for future reference.

Cross Reference

A cross reference report lists all occurrences of an address and/or symbol in a ladder program. It also lists associated address comments, if any. Labels are shown on the cross reference report only when all addresses are indicated in the report. Press [F5] to get report options.

PLC-3 PROGRAMMING SOFTWARE [ONLINE]

MONITORING	CONTEXT	DATA TABLE	PROGRAM	MESSA	DOCUMENTATION
1	STATIONS3	10039	575	2	
CROSS REFERENCE OPTIONS					Program Listing Cross Reference Memory Map Processor Status I/O Status Data Tables Force Status Symbol Table Unused Addresses Memory Usage Report Gen Procs Data Hwy Procs
F1 Starting File #00 Ending File #S999					
F2 Sort Order ADDRESS					
F3 Address Comments YES					
F4 Instruction Mnemonics YES					
F9 Save to File					
ESC aborts changes					

Press a function key

PROGRAM	FILE	SORT	ADDRESS	memory UNPROTECTED	INSTRUC	Direct Connect
RANGE	ORDER	COMMENT	COMMENT	INSTRUC	TO FILE	SAVE
F1	F2	F3	F4	F4	F9	F9

Function Key:

Function:

[F1] - File Range

Prompts you to enter the starting and ending files of the range for cross reference. Addresses are in data table order.

[F2] - Sort Order

Toggles between SYMBOL and ADDRESS. SYMBOL prints only addresses that are used and have symbols associated with them and sorts them by letter and number. ADDRESS prints all addresses in the program, followed by any existing symbol, comment, mnemonic, etc. and sorts by logical address. Addresses are sorted in data table order, not alphabetical order.

[F3] - Address Comments

Toggles between YES and NO to print address comments with the cross reference report.

[F4] - Instruction
Mnemonics

Toggles between YES and NO. YES prints the mnemonic with the address or symbol.

[F9] - Save to File

Saves this configuration to disk for future reference.

Memory Map

A Memory Map report lists how processor memory is used for data tables, status files, and program files. No options exist for this report.

Processor Status

This report lists the processor status at the time the report is generated. No options exist for this report.

I/O Status

This one-page report lists the I/O status at the time the report is generated. No options exist for this report.

Data Table

This report lists the contents of the data table at the time the report is generated. The report options for the data table report are:

[F1] - File Range

Prompts you to enter the starting and ending files of the range. Addresses are in data table order. If you want a total data table report, the starting file is #00 and ending file is #S999.

[F9] - Save to File

Saves this configuration to disk for future reference.

To specify timer, counter or pointer section of the data table, enter T, C, or P and press [ENTER].

To specify files in any other section of the data table, enter the section specifier and a file number and press [ENTER]. Here is the data table options display:

PLC-3 PROGRAMMING SOFTWARE					[ONLINE]								
MONITORING	CONTEXT	CONTEXT	NAME	DATA TABLE	PROGRAM	MESSA	DOCUMENTATION						
	1		STATION3	10039	575	2	Program Listing * Cross Reference Memory Map Processor Status I/O Status Data Tables Force Status Symbol Table Unused Addresses Memory Usage Report Gen Procs Data Hwy Procs						
DATA TABLES OPTIONS <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">F1 Starting File</td> <td style="width: 50%;">#00</td> </tr> <tr> <td>Ending File</td> <td>#S999</td> </tr> <tr> <td colspan="2">F9 Save to File</td> </tr> </table>								F1 Starting File	#00	Ending File	#S999	F9 Save to File	
F1 Starting File	#00												
Ending File	#S999												
F9 Save to File													
ESC aborts changes													

Press a function key

PROGRAM
FILE
RANGE
F1

memory UNPROTECTED

Direct Connect
SAVE
TO FILE
F9

This table lists section specifiers and the order of the data table sections in PLC-3 memory.

Data Table Sections (in order)	Section Specifiers
Output image	O
Input image	I
Timer	T
Counter	C
Integer	N
Floating point	F
Decimal	D
Binary	B
ASCII	A
High order integer	H
Pointer	P
Status	S

If you want to print non-contiguous data table files, you will need to create multiple reports.

Here are some sample file ranges.

To print:	Enter these starting and ending addresses:
Real outputs only	O0 and O0
All output files	O0 and O999
All timers and counters	T and C
Input file 5	I5 and I5
ASCII files 5 through 10	A5 and A10

Force Status

This report shows the force status (bits forced ON or OFF) of the input and output data tables at the time the report is generated. No options exist for this report.

Symbol Table

This report lists all symbols and their corresponding logical addresses. [F2] - Sort Order toggles between SYMBOL and ADDRESS as the sort criterion. Addresses are sorted in data table order. If you select this report and a database does not exist, it is created automatically. Otherwise, you can create the database with the "General Options" to "Insure Valid X-Ref. Info".

PLC-3 PROGRAMMING SOFTWARE						[ONLINE]
MONITORING	CONTEXT		DATA TABLE	PROGRAM	MESSA	DOCUMENTATION
CONTEXT	NAME					
1	STATION3		10039	575	2	Program Listing * Cross Reference Memory Map Processor Status I/O Status Data Tables Force Status Symbol Table Unused Addresses Memory Usage Report Gen Procs Data Hwy Procs
						SYMBOL TABLE OPTIONS F2 Sort Order SYMBOL F9 Save to File ESC aborts changes

Press a function key

PROGRAM

SORT
ORDER
F2

memory UNPROTECTED

Direct Connect
SAVE
TO FILE
F9

Unused Addresses

This report lists all unused addresses that exist in the database. No options exist for this report. If you select this report and a database does not exist, it is created automatically. Otherwise, you can create the database with the "General Options" to "Insure Valid X-Ref Info".

Memory Usage

This report shows how processor memory is allocated.

PLC-3 PROGRAMMING SOFTWARE [ONLINE]

MONITORING CONTEXT	NAME	DATA TABLE	PROGRAM	MESSA	DOCUMENTATION
1	STATION3	10039	575	2	Program Listing * Cross Reference Memory Map Processor Status I/O Status Data Tables Force Status Symbol Table Unused Addresses Memory Usage Report Gen Procs Data Hwv Procs

MEMORY USAGE OPTIONS

F1 Starting File #00

Ending File #S999

F9 Save to File

ESC aborts changes

Press a function key

PROGRAM

FILE

RANGE

F1

memory UNPROTECTED

Direct Connect

SAVE

TO FILE

F9

Here are the report options:

[F1] - File Range

Prompts you to enter the starting and ending files of the range. Addresses are in data table order. If you want a total memory usage report, the starting file is #00 and ending file is #S999.

[F9] - Save to File

Saves this configuration to disk for future reference.

Report Generation Procedures

This report lists report generation procedures that are in the processor. Here is this display:

PLC-3 PROGRAMMING SOFTWARE					[ONLINE]	
MONITORING CONTEXT	CONTEXT	NAME	DATA TABLE	PROGRAM	MESSA	DOCUMENTATION
	1	STATION3	10039	575	2	Program Listing * Cross Reference Memory Map Processor Status I/O Status Data Tables Force Status Symbol Table Unused Addresses Memory Usage Report Gen Procs Data Hwy Procs
REPORT GENERATION PROCEDURES OPTIONS						
F1 Starting Procedure @A Ending Procedure @ZZZZZZZ						
F3 Sort PROCEDURE NAME						
F9 Save to File						
ESC aborts changes						

Press a function key

PROGRAM		memory UNPROTECTED	Direct Connect
PROC	SORT		SAVE
RANGE			TO FILE
F1	F3		F9

Several options are available:

[F1] - Proc Range

allows you to select the range of procedures to include in the report.

[F3] - Sort

toggles between sorting alphabetically by PROCEDURE NAME or numerically by PROCEDURE NUMBER.

[F9] - Save to File

Saves this configuration to disk for future reference.

Data Highway Procedures

This report lists Data Highway procedures that are in the processor. Options are the same as for Report Generation Procedures listed above. Here is the display you see:

PLC-3 PROGRAMMING SOFTWARE					[ONLINE]	
MONITORING CONTEXT	CONTEXT	NAME	DATA TABLE	PROGRAM	MESSA	DOCUMENTATION
	1	STATION3	10039	575	2	Program Listing * Cross Reference Memory Map Processor Status I/O Status Data Tables Force Status Symbol Table Unused Addresses Memory Usage Report Gen Procs Data Hwy Procs
DATA HIGHWAY PROCEDURES OPTIONS						
F1 Starting Procedure @A Ending Procedure @ZZZZZZZ						
F3 Sort PROCEDURE NAME						
F9 Save to File						
ESC aborts changes						

Press a function key

PROGRAM		memory UNPROTECTED	Direct Connect
PROC	SORT		SAVE
RANGE			TO FILE
F1	F3		F9

General Options

When you press [F6] - General Options, the following display appears:

MONITOR
CONTEXT

1

PLC-3 PROGRAMMING SOFTWARE

[ONLINE]

PROGRAM LISTING OPTIONS

Starting Rung M:0
Ending Rung F:32767

Power Rail YES

Ad GENERAL LISTING OPTIONS

Ad

Ru F3 Configure Printer

La F4 Destination PRINTER

F5 Insure Valid X-Ref Info YES NO

F6 Graphics Mode

F7 Page Width 80

§a F8 Page Length 66

F9 Save to File

ESC aborts changes

A DOCUMENTATION
Program Listing
Cross Reference
Memory Map
Processor Status
I/O Status
Data Tables
Force Status
Symbol Table
Unused Addresses
Memory Usage
Report Gen Procs
Data Hwy Procs

Press a function key

PROGRAM	memory UNPROTECTED							Addr 53
	PRINTER	DEST	VALID	GRAPHIC	PAGE	PAGE	SAVE	
	CONFIG		X-REF	MODE	WIDTH	LENGTH	TO FILE	
	F3	F4	F5	F6	F7	F8	F9	

These options pertain to all reports that you can generate.

Function Key:	Function:
[F4] - Dest	Allows you to choose FILE or PRINTER as the destination for the report.
[F5] - Valid X-ref	Toggles between YES and NO to generate a cross reference data base.
[F6] - Graphics Mode	Toggles between YES and NO. YES means that your printer has graphics capability and that graphics are enabled.
[F7] - Page Width	Toggles between 80 and 132 characters wide.
[F8] - Page Length	Toggles between 66 and 69 lines long.
[F9] - Save to File	Saves this configuration to disk for future reference.

Generating the Report

After you have configured all necessary program options, return to this display by pressing [ENTER].

When you press [ENTER], the following display appears, showing the status of the reports being generated. You can stop the process at any time by pressing [CTRL] [C].

ALLEN-BRADLEY CO.			
6200 SERIES SOFTWARE			
PLC-3 DOCUMENTATION SOFTWARE			

Proc Addr:	Direct	Report:	
Output File:	PRINTER	Config:	
Phase:	DATABASE REGENERATION	Status:	Rung M:4


```

** ESTABLISH COMMUNICATIONS **
** OPEN DATA BASE **
** REGENERATE CROSS REFERENCE DATA BASE **

```

Press Control_C to Abort

The following status information appears during report generation:

Report: changes to show the current report being generated.

Output File: changes to show the file name to which the current report is being written.

Config: shows limits for processes that use file ranges.

Phase: changes to show the communication and generation status.

Status: changes to show the status of the current report.

When all requested reports are completed, the display will update to show "COMPLETE" and "Successful Completion" next to the "Phase" and "Status" markers.

Pressing any key will return you to the 2nd menu.

Print Reports

You can print all or any portion of the reports you sent to file and want to print at a later time by following these steps.

1. After you have returned to the 2nd menu, press [F3]
Return to Menu to return to the top menu:

PLC-3 PROGRAMMING SOFTWARE	
A 6200 Series Software Product	
Allen-Bradley Company Copyright 1987	
All Rights Reserved	
Fri Feb 26, 1988	2:46:21 pm
Current Device: 1784-KTP	

Press a function key

ONLINE ONLINE
PRG/DOC CONFIGR
F1 F2

SYSTEM FILE PRINT RECORDR EXIT
STARTUP OPTIONS REPORTS OPTIONS SYSTEM
F6 F7 F8 F9 F10

2. Press [F8] - Print Reports. A display appears listing the programs stored on the hard disk.

PLC-3 PROGRAMMING SOFTWARE		
PRINT STATIONS	Size	Date
Report		
Program Listing	73171	02-26-88
Memory Map	17439	02-26-88
Processor Status	2783	02-26-88
Force Status	23717	02-26-88
Unused Addresses	2803	02-26-88
I/O Status	7350	02-26-88
Data Highway	2356	02-26-88
ESC exits		

Press a function key, or press ENTER to perform operation

SELECT TOGGLE CLEAR PRINTER SELECT PRINT
ALL SELECT ALL CONFIG PROCESS FILES
F2 F3 F4 F5 F6 F7

3. Select the desired program you want to print and press [ENTER]. The following display appears listing all of the reports that you can print.

PLC-3 PROGRAMMING SOFTWARE		
PRINT STATIONS		
Report	Size	Date
Program Listing	73171	02-26-88
Memory Map	17439	02-26-88
Processor Status	2783	02-26-88
Force Status	23717	02-26-88
Unused Addresses	2803	02-26-88
I/O Status	7350	02-26-88
Data Highway	2356	02-26-88
ESC exits		

Press a function key, or press ENTER to perform operation

SELECT	TOGGLE	CLEAR	PRINTER	SELECT	PRINT
ALL	SELECT	ALL	CONFIG	PROCESS	FILES
F2	F3	F4	F5	F6	F7

Key:

[F2] - Select All

[F3] - Toggle Select

[F4] - Clear All

[F5] - Printer Config

[F6] - Select Processor

[F7] - Print Files

Function:

Mark with a check or asterisk and print all reports listed.

selects the cursored report by displaying a check-mark or asterisk. Press [F3] again to remove the check mark.

Removes all check-marks or asterisks, cancelling all selections.

Displays the printer configuration window, discussed later.

Lists the program directory names. Cursor to the desired name and press [ENTER] if you want to print reports other than the ones you just generated.

Starts printing. If the printer is not properly configured or unattached to the terminal, the message "PRINTER NOT READY..." is displayed.

4. Make sure your printer is properly configured, using [F5] - Printer Configuration (see the next section if you don't know how to do this).
5. Press [F7] - Print Files. The message "PRINTING IN PROGRESS, PRESS CONTROL-C TO STOP PRINTING" appears under the window. "PRINT COMPLETE" appears when all data has been sent to the printer.

Configuring the Printer

Use the manual for your printer to determine the configuration. When you press [F5] - Printer Configuration, the following display appears. First we show the display you see if you select parallel, then we show you the display for serial.

PLC-3 PROGRAMMING SOFTWARE			
PRINT STATION3			
Report		Size	Date
Program Listing		73171	02-26-88
Mem	Printer Configuration		-88
Pro			-88
For	F1 Printer Type PARALLEL		-88
Unu	F2 Port LPT1		-88
I/O			-88
Dat			-88
F9 Save Configuration			
ESC	Press ENTER/ESC to Exit		

PRINTER PORT
TYPE NUMBER
F1 F2

SAVE
CONFIG
F9

PLC-3 PROGRAMMING SOFTWARE			
PRINT STATION3			
Report		Size	Date
Program Listing		73171	02-26-88
Mem	Printer Configuration		-88
Pro			-88
For	F1 Printer Type SERIAL		-88
Unu	F2 Port COM1		-88
I/O	F3 Baud 9600		-88
Dat	F4 Bits/Char 8		-88
	F5 Stop Bits 2		
	F6 Parity NONE		
	F7 Duplex HALF		
	F9 Save Configuration		
ESC	Press ENTER/ESC to Exit		

PRINTER	PORT	BAUD	BITS /	STOP	SELECT	SELECT	SAVE
TYPE	NUMBER	RATE	CHAR	BITS	PARITY	DUPLEX	CONFIG
F1	F2	F3	F4	F5	F6	F7	F9

Parallel

Function Key:

[F1] - Printer Type

[F2] - Port Number

Function:

Toggles between "serial" and "parallel".

For serial printers, toggles between "COM1" and "COM2". For parallel printers, toggles between "LPT1" and "LPT2".

To make the following selections, refer to the manual that comes with your printer.

Serial

[F1] - Printer Type

[F2] - Port Number

[F3] - Baud Rate

[F4] - Bits/Char

[F5] - Stop Bits

[F6] - Select Parity

[F7] - Select Duplex

[F9] - Save Config

Toggles between "serial" and "parallel".

For serial printers, toggles between "COM1" and "COM2". For parallel printers, toggles between "LPT1" and "LPT2".

Goes through the six available baud rates, 300, 600, 1200, 2400, 4800, & 9600.

Toggles between 7 or 8 bits/character.

Toggles between 1 or 2 stop bits.

Goes through the three types of parity: none, even, & odd.

Toggles between half and full duplex.

Saves this configuration to disk for future reference.

Import/Export Description

The Import/Export Utility transfers symbols/comments in/out of the database in an A-B ASCII form that you can manipulate with your text editor.

- **Import** allows you to transfer symbols, instruction, address, and rung comments from an A-B ASCII file into the software database. The A-B ASCII file must follow a specified format that we describe in this update.
- **Export** allows you to transfer symbols, instruction, address and rung comments from the software database to an A-B ASCII file.
- **PLC-3 area five rung comment importer** transfers T4 rung comments that are stored in PLC-3 processor memory, area E5.X.2, into an A-B ASCII file. After the rung comments have been transferred to the A-B ASCII file, you can use the import function to transfer the comments into the database.

WARNING: Before you use the Import/Export utility to import, be sure that you back up your database.

Before you import or append a data base, you should save your current work. If you do not, you could lose that work if you abort an import/append operation.

You could also lose your work if you import or append a data base, and the status screen tells you that **"Collisions and/or syntax errors were found. Complete operation [N]?"** and you answer "N".

For example, if you edit a data base and start to append another data base (without saving current work), then change your mind in the middle of the append operation (by pressing [Ctrl] [Z]), you stop the append process **AND** lose any edits to the original data base.

How To Access Import/Export

You access the import and export utilities by selecting [F7] - File Options on the top menu. When you see the File Operations screen, press [F6] to import or [F7] to export.

How To Access ABA5RCIM

The Area Five Rung Comment Import utility is not accessible through a menu. To use the Area Five Rung Comment Import utility, you enter this command line at the DOS prompt:

```
CD \IPDS\TEXT [Enter]  
ABA5RCIM [Enter]
```

Then at the > prompt, type: **ABA5RCIM**

Features

Import/Export Utility lets you:

- re-use existing work. After exporting a file, you can import comments you've previously used to document your ladder programs into the database. Then you can retrieve these comments and use them again in other programs.
 - use any word processor to enter or edit comments and symbols for your ladder programs. Input comments and symbols in the format we show you in this manual.
-

How Import/Export Works

This diagram gives you an idea of how the software transports your ladder program documentation.

Definitions

Here are some terms we use in this document that you need to understand.

A-B ASCII file - This term means printable, non-graphic ASCII characters. The text editor you use must produce ASCII characters without control codes or hidden characters. To ensure your editor does produce only printable ASCII characters, enter a few lines of text (samples are provided on the last pages of this document) and run import.

Database - refers to the internal format your 6200 software uses to store your address comments, instruction comments, rung comments and symbols.

Keyword - tells the software whether the information immediately following the keyword is an instruction comment, an address comment, a rung comment, or a symbol. Keywords are:

IC - instruction comment

AC - address comment

RC - rung comment

SYM - symbol

How To Use The Import Utility

WARNING: Before you import, be sure that you back up your database.

1. From the top menu, press [F7] - File Options.
2. Select [F6] - Import
3. You are asked to:

"Press a Function Key or Enter File Name"

4. The software lists all A-B ASCII files available for import. Type the file name and press [ENTER] or position the cursor on the file you wish to import (using up, down arrow keys, Pg Up, Pg Dn, Home, or End keys or by entering part of the file name).

Note: The export utility automatically stores files in the \IPDS\TEXT\PLC3 directory or the user defined directory for import files. You should place in this directory any files that you create (using an A-B ASCII text editor and .TXT extension). This is the only way you can import these files.

5. Press [F3] - Select Source to select the A-B ASCII file you want to import.
6. Press [F4] - Enter Destination. You will see the prompt, "Enter File Name (No EXT) > "

Enter an 8-character (or less) name for the database that you want to create or update and press [ENTER].

7. Press [F5] - Select Options. The Import Options menu appears.

You can select the action taken upon data collisions - "discard" or "overwrite" (collisions are described on the next page). The discard option will keep the existing data and ignore the new import data; the overwrite option will replace the existing data with the new import data.

You can also select a default keyword (keywords are described in the section "How To Create an A-B ASCII File.")

After you have made your choices:

- . press [ENTER] or [ESC] to accept the configuration for just this editing session, returning to the Import menu screen OR
- . press [F9] - Save Configuration to save this information to the hard disk OR
- . press [ALT] [U] to cancel the changes for this session.

8. Press [F1] to begin.

Note: If the destination you entered already exists, you are asked if you want to add this new information to the existing data base, overwrite the existing data base, or exit. If overwrite is selected, you cannot recover the original export documentation once the process begins.

After you answer the questions, import begins.

Notice the messages in the lower part of our display. We created these errors to explain collisions and/or syntax problems (see next sections). If these errors occur during the import operation, this question is displayed in the middle of your screen:

Collisions and/or syntax errors were found. Complete operation [N]?

[N] is the default response. If you press [ENTER], the operation aborts and your database does not change **unless you specified overwrite** - there is no recovery from an overwrite. If you enter [Y], your database is overwritten with the data in the A-B ASCII file you selected.

Syntax Errors

If the display tells you that syntax errors were found, we recommend you do not import the file into your database. Syntax errors mean that rules, which are established for an A-B ASCII file, were violated. Here are examples of syntax errors:

- comment is too long
- missing quotes around your comments
- invalid address
- keyword error, like entering SC instead of AC
- invalid instruction

Collisions

If collisions were found, you can continue with import if you are sure that these collisions do not affect on your database. Look at your .LOG file. Collisions mean you have duplicate entries and/or conflicting entries. Here are examples of collisions:

database	A-B ASCII	explanation
<i>addr sym</i>	<i>addr sym</i>	
I110/11 LSI	I110/11 LSI	duplicate entry (different address, same symbol)
I111/11 LS2	I111/11 LS3	conflict (same address, different symbol)

.LOG File

When an import completes, the system generates a .LOG file. This file contains the same information about errors that appears on the screen during the actual operation. For example, if a data collision occurred, the .LOG file contains both pieces of data that collided.

The .LOG file has the same name as the ASCII file that you imported. The system stores this file in the current directory defined by the Define Directory option on the Import Utility screen.

To use the information in the .LOG file with the associated processor memory file, do the following:

1. Use a word processor to edit the .LOG file so that it contains the data you want.
2. Change the .LOG extension to .TXT
3. Import the resulting file.

How To Use the Export Utility

1. From the main menu or from the program directory screen press [F7] - File Options.
2. Select [F7] - Export
3. You are asked to:
"Press a Function Key or Enter File Name"
4. The software lists all database files available for export. Type the data base file name and press [ENTER] or position the cursor on the file name.

Note: The export utility stores data base files in the \IPDS\TEXT\PLC3 directory or the user defined directory for export files.

5. Press [F3] - Select Source
6. Press [F4] - Enter Destination. You are asked:

"Enter File Name (No EXT)>"

Enter an 8-character (or less) name for the A-B ASCII file that you want to create or update and press [ENTER].

7. Press [F5] - Select Options. The Export Options menu appears with these options:

[F3] - Sort Order

Keyword means your A-B ASCII file sorts by keyword in this order:

- symbols
- address comments
- instruction comments
- rung comments

If you want data sorted by **address**, all symbols and comments associated with an address are grouped together. Addresses are in data table order.

[F4] - Keyword Option

Select ALL keywords (symbol, address, instruction, or rung comments), DEFAULT keyword (symbol), or no (NONE) keywords.

ALL - outputs keywords at the beginning of every statement.

DEFAULT - outputs keywords at the beginning of a group of similar statements. You must select "Sort by Keyword".

NONE - prints no keywords. You can only use this when selecting only one keyword for export.

[F5] - Symbols

Select EXPORT to include symbols in the A-B ASCII file. Select DO NOT EXPORT if you do not want symbols included.

[F6] - Address Comments

Select EXPORT to include address comments in the A-B ASCII file. Select DO NOT EXPORT if you do not want address comments.

[F7] - Instruction Comments

Select EXPORT to include instruction comments in the A-B ASCII file. Select DO NOT EXPORT to ignore instruction comments.

[F8] Rung Comments

Select EXPORT to include rung comments in the A-B ASCII file. Select DO NOT EXPORT if you do not want rung comments included.

[F10] - Select Range

[F2] - Select All. Export all addresses in the database.

[F3] - Single File. Export one file in the database.

[F4] - Select Range. Enter starting and ending address to export. Ranges are in data table order.

When you select a range, all file addresses within that range are exported.

After you have made your choices:

- . press [ENTER] or [ESC] to accept the configuration for just this editing session and return to the Export menu screen OR
- . press [F9] - Save Configuration to save this information to the hard disk, then press [ENTER] to return to the Export menu screen OR
- . [ALT] [U] to exit without changing the configuration for this session.

8. Press [F1] to begin.

Note: If the destination you entered already exists, you are asked if you want to add this new information to the existing file, overwrite the existing file or exit.

The Import/Export status screen appears displaying process status and any error messages.

The export file created resides in the \IPDS\TEXT\PLC3 directory or the user defined directory.

At this point you can use DOS commands to edit, copy and print your A-B ASCII file.

How To Use the Area Five Rung Comment Import Utility

This utility lets you transfer area five rung comments from a PLC-3 processor into an A-B ASCII file. You can then move the rung comments to your PLC-3 online software using the import utility.

To use ABA5RCIM, return to DOS and enter:

```
CD \IPDS\TEXT [Enter]  
ABA5RCIM [Enter]
```

How To Configure Communications

You must connect to a PLC-3 processor to run this utility. Before you run ABA5RCIM, use your PLC-3 online software to configure communications with your PLC-3. Be sure to save the configuration to file. Refer to chapter 3 in publication 6200-6.5.3 -- March 1988.

Use the Running Context

Rung comments transfer only from the running context of the PLC-3 processor. If you want rung comments read from a context other than the running context, you must change the running context using the LIST function.

If You Want To Abort Import

You can use [Ctrl] [Z] anytime during the import operation to stop the process. When you press [Ctrl] [Z], you are asked whether the process should actually be aborted. If you respond [Y], a message appears in the log window and log file states the import operation was ceased. The output file is closed at the point you quit. If you respond [N], the import process continues.

What You See in the Display

When you enter the area five rung comment import utility, you see a display that asks you to enter information about the A-B ASCII file you want to create/update.

Here is the display:

A 6200 Series Software Product
Allen-Bradley Company Copyright 1987, 1988, 1989
All Rights Reserved

Welcome to the Area 5 rung Comment Import Utility.

Please enter the output filename: LINE5

This file already exists, should it be deleted before import [N] ?

At the prompt:

Please enter the output filename:

You supply a name for the output file name (without extension) of the A-B ASCII file that is to receive the area-five rung comments.

If this file name exists already, this message appears:

This file already exists. Should it be deleted before import [N]?

You indicate whether the file should be overwritten or appended to a previously existing file with the same name. If you press [Enter] for the default response [N], the imported comments are added to the existing file.

Important: Before you respond with [Y], be sure you want to delete the previously existing output file because it can never be recovered.

The following display appears during the import:

```

|                                     |
|      ALLEN-BRADLEY COMPANY         |
|      6200 SERIES SOFTWARE         |
|      PLC-3 IMPORT/EXPORT SOFTWARE  |
|                                     |

```

```

Proc Addr:  Direct      Utility: Area 5 Rung Comment Import
Output File: LINE5      Config: Context 1
Phase:      COMPLETED  Status: Successful Completion

```

```

|                                     |
| ** ESTABLISH COMMUNICATIONS **    |
| ** BEGIN IMPORT **                |
| %% Rung comment cannot be assigned to MCR, rung M:0 %% |
| %% NO COMMENT EXISTS FOR RUNG COMMENT 7 RUNG M:3 %%   |
| %% NO COMMENT EXISTS FOR RUNG COMMENT 4 RUNG M:6 %%   |
| %% Rung comment cannot be assigned to END, rung M:8 %% |
| ** 13 COMMENTS IMPORTED **       |
| ** 49 LINES WRITTEN **           |
|                                     |

```

Strike a key when ready . . .

Display Areas

There are three areas in this display:

- . The top of the display is the identification window. It tells you that you are using the PLC-3 import/export software utility.
- . The middle area is the status window. This highlighted area provides useful information about the status of the utility.
- . The bottom area is the log message window. Error messages are displayed here.

How To Create an A-B ASCII File

Here we explain how you can create your own A-B ASCII file. The file you create is used by the import utility.

You use the text editor on your computer to create or modify the A-B ASCII file. Your text editor must produce only printable ASCII characters. Graphics characters are not allowed. The file you create must be in the \IPDS\TEXT\PLC3 directory.

The name you give your A-B ASCII file can have up to 8 characters that consist of:

A-Z
0-9
underscore ____

Your file name must have the .TXT extension.

Let's Begin

Go into your text editor. You are ready to begin. We tell you how to:

- enter keywords, symbols, address, instruction and rung comments
- document your A-B ASCII file

Entries may be in upper or lower case, or mixed.

How To Build Your File

You can build your file in two ways:

1. You can use a default keyword to enter comments as shown here:

```
SYM
00:77/03    UPLOADHYD
00:111/11   EMPTY_LITE
00:112/12   NOZ_FILL
AC
00:11/06    "comment-6"
00:135/12   "Temporary\Storage\Point"
IO:3/02     "Conveyor\Running"
```

Notice that all symbols (SYM) are grouped together after you enter the keyword SYM. Then all address comments (AC) follow the keyword AC. The same default keyword may appear multiple times in your file.

2. You can use a keyword on each line and arrange your file in any order, like this:

```

SYM      I:0/00  C5UNDERFL
AC       I:0/00  "Totalizer\Pulse\Counter"
IC  XIC   I:0/00  "Surge Tank\Low Level\Alarm"
IC  XIO   I:0/00  "North\Cutter\Running"
IC  XIC   I:0/01  "Palletizer\Not Full"
```

Notice that we did not use default keywords. Rather, we entered a keyword on each line so entries did not have to be in any particular order.

Keywords

Here are the keywords you can use:

Keyword	Definition
S[YM]	symbol
A[C]	address comment
I[C]	instruction comment
R[C]	rung comment

The portion of the keyword that appears in brackets is optional. For example, to indicate address symbol, you may type S or SYM.

What Goes in the A-B ASCII File

Here are entries you can put into your A-B ASCII file:

```

.  symbol
.  address comment
.  instruction comment
.  rung comment
```

Symbol

A symbol is the 10-character name associated with an address. You may use characters:

```

A-Z
0-9
underscore _
```

Here are examples of entering symbols:

```

SYM      0:17/03  Upload
SYM      0:11/11  Empty_Lite
SYM      I:16/05  Pallet_NF
```

Note that you cannot assign a symbol to a label number or program file number.

Address Comment

An address comment is a maximum 50-character text string associated with an address. You must begin and end address comments with quotation marks ("). Do not use carriage returns. If you want a carriage return to appear in the comment, use a backslash (\) in the comment to represent a carriage return. Only the first 50 characters you enter are used in the comment. If you use quotation marks in your comment, two adjacent quotation marks must be used. If you use a backslash in your comment, precede the backslash with a tilde (~) character so that it is not interpreted as a carriage return. Here is how you enter address comments:

```
AC      0:17/03      "UPPER\LOADER\HYDRAULIC\SOLENOID"
AC      I:14/11      "OUT OF\TOLERANCE\ALARM\ACKNOWLEDG"
AC      I:21/03      "AIR STOP\CLOSED\LIMIT\SWITCH"
AC      LBL12        "CALL POWER\CHECK\SUBROUTINE"
AC      LBL5         "PROGRAM\FILE #"
```

The second-to-last example shows you how to assign an address comment to a label number. **LBL12** specifies label #12 in the ladder program.

Instruction Comment

The instruction comment is associated with the address/instruction pair and may be up to 50 characters. You enter the instruction comment keyword and then the mnemonic for the instruction to which the comment is to be bound. You must begin and end instruction comments with quotation marks ("). Do not use carriage returns. If you want a carriage return to appear in the comment, use a backslash (\) in the comment to represent a carriage return. Only the first 50 characters you enter are used in the comment. If you use quotation marks in your comment, two adjacent quotation marks must be used. If you use a backslash in your comment, precede the backslash with a tilde (~) character so that it is not interpreted as a carriage return.

Here are examples of instruction comments:

```
IC  XIC  N7:10/0      "Surge Tank\High Level\Alarm"
IC  XIO  I:0/00       "Selector\Switch\Panel W\North\Cutter"
IC  OTE  0:0/00       "North\Cutter\Running"
IC  JSR  LBL3         "Call Power\Check\Subroutine"
```

The last example shows you how to assign an instruction comment to a label number.

Rung Comment

You begin and end rung comments with a quotation mark and carriage return combination. Initial and ending quotation marks are not included in the comment.

You must begin and end rung comments with quotation marks ("). If you want a carriage return to appear in the comment, use a backslash (\) in the comment to represent a carriage return. Rung comments can be 6 lines of 80 characters. Rung comments are tied to the address and instruction of the right-most output instruction. If you use quotation marks in your comment, two adjacent quotation marks must be used. If you use a backslash in your comment, precede the backslash with a tilde (~) character so that it is not interpreted as a carriage return.

Example: This is an example of a rung comment:

```
RC   CTD C5           " (carriage return)
Rung comments can be 6 lines of 80 characters.\
Rung comments are tied to the address and instruction\
of the rightmost output instruction."
```

How to Document Your A-B ASCII File

You can make notes about your A-B ASCII file as you create it. These notes document the file and are in addition to address, instruction or rung comments. To document your file, insert your import file notes after an exclamation mark on a single line. All text, after the exclamation mark up to the next end-of-line, are ignored during import. Your notes exist as the only text on a line or directly after you enter a complete line.

Here is an example of making notes about your import file.

```
!Import file comments must begin with an explanation
!mark as you see here. You can document your A-B
!ASCII file as you would a program.
```

NOTE: Since these comments are ignored for import, they are not exported.

Delete Context

Delete Context [F5] has been added to the Processor Functions Options. To delete a context:

- select [F1] - Online Configuration from the top menu
- select [F1] - Processor Functions. This menu will appear:

PLC-3 PROGRAMMING SOFTWARE						[ONLINE]
RUNNING	CONTEXT	NAME	DATA TABLE	PROGRAM	MESSAGE	TOTAL
	1	STATION6	624	54	0	679

Press a key.

RUN
Change Mode
F1

List
F2

Mem: Unprotected
Delete Context
F5

Create Context
F6

Dir Display
F7

PLC-3 Direct
Monitor Program
F8

Change Name
F9

- cursor to the context you want to delete
- press [F5] Delete Context

Rules for Delete Context

Before you select Delete Context [F5], read these rules:

Program Mode

- Context 0 cannot be deleted.
- Context 1 and/or the running context will be deleted and recreated with default memory. All other contexts will be deleted.

Other Modes

- If you are not in Program mode, the running context cannot be deleted.

After you press [F5] this menu appears. Select [F8] to delete the running context; select [F10] if you decide not to delete it.

PLC-3 PROGRAMMING SOFTWARE						[ONLINE]
RUNNING CONTEXT	CONTEXT NAME	DATA TABLE	PROGRAM	MESSAGE	TOTAL	
1	STATION6	624	54	0	679	

Press a key, enter Y <RETURN> to confirm; enter N <RETURN>, or <ESC> to abort.
Delete Context? >

RUN

Mem: Unprotected

PLC-3 Direct

Yes
F8

No
F10

Delete Context screen

Save and Continue

The save and continue feature lets you periodically save sequential function charts, ladder programs, and database entries as you work with them. This feature is available in online and offline programming:

Programming:	Result:
Online	Saves the database files. To save the processor memory file, you must use Save Restore. See the next section for information on Save Restore.
Offline	Saves the processor memory file and database files.

The save and continue feature is available through [F2] - Save & Continue. This key appears on the following screens:

Function Key:	Screen:
[F2]	Save and Merge (offline)
[F2]	Ladder Editor Program Directory (online & offline)
[F10]	Ladder Editor Documentation (online & offline)

Report Extensions

Here is a list of report extensions:

.LIS	Program Listing
.XRF	Cross Reference Report
.MMR	Memory Map Report
.PSR	Processor Status Report
.DTR	Data Table Report
.FSR	Force Status Report
.STR	Symbol Table Report
.UAR	Unused Address Report
.MUR	Memory Usage Report
.DHR	Data Highway Report
.RGR	Report Generation Report
.IOR	I/O Status Report
.TXT	Import/Export Text File (in \IPDS\TEXT\PLC3)
.LOG	Import/Export Log File (in \IPDS\TEXT\PLC3)

Enter Printer Escape Sequences

Now you can use control codes or escape sequences to put your printer in compress-print mode. Enter a command string and send it to your printer prior to printing listings. .

1. From the Main Menu, press [F8] - Print Reports, type the file name and press [ENTER] or position the cursor on the file you wish to print (using up, down arrow keys, Pg Up, Pg Dn, Home, or End keys or by entering part of the file name) and press [F3]

OR

Press [F6] - System Configuration

2. Press [F5] - Printer Configuration
3. Press [F8] - Printer Setup
4. Press [F7] - Use String (select "yes")
5. Press [F8] - Printer String. A window appears prompting you to enter the string. Use the \ (back slash) character to enter ASCII codes, such as \x18 for ESC in hex, \o33 for ESC in octal, or \d27 or \27 for ESC in decimal (the "d" is optional).

Assemble Edits

After assembling edits in the Ladder Editor, the software returns to the original rung **number** that the cursor was on.

Save Report Titles

You can save titles for documentation reports to disk when archiving logical, physical or context directory files.

Printer Configuration

[F3] - Printer Config is added to the General Options menu.

Introduction

The following information helps you when you connect to Allen-Bradley's 1784-T45 Portable Terminal, 6122 Industrial Computers or an IBM XT.

T45 Information

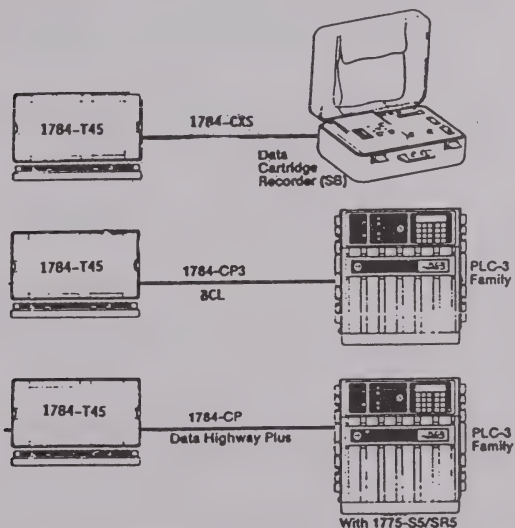
Important: Make sure your CONFIG.SYS file contains the following statements:

```
FILES = 20
BUFFERS = 16 (or any number between 16 and 30)
DEVICE = ANSI.SYS
DEVICE = EMM.SYS M1 I5
```

NOTE: If ANSI.SYS or EMM.SYS is not in the root, you must include the path that contains ANSI.SYS or EMM.SYS in the DEVICE statement above.

T45 Cabling

Here are the cables you need to connect the 1784-T45 to a recorder and PLC-3 (BCL and DH+).



T45 Communication Configuration

In the on-line portion of the software, configuration of the 1784-KL module has been added to the Online Configuration path in the menu system. This module allows the T45 to communicate with PLC-3 Family processors. Be sure to select the 1784-KL (DH+ or BCL) in the Online Configuration path before attempting to run the on-line software by pressing [F2] - Select Device. You can choose from:

- . 1784-KL (DH+)
- . Serial to DH+
- . 1784-KL (BCL)

T45 Instruction**Intensification**

We recommend that you use reverse video because the T45 cannot intensify. You can select the type of intensification in the ladder editor. Use the System Configuration path in the menu system. Here are the selections you make:

Select [F6] - System Configuration, then [F1] - System Options. We recommend that you use REVERSE VIDEO.

System Configuration - [F6] provides one entry point to configure all system parameters:

- . System Options [F1]
 - . Printer Configuration [F5]
 - . System Startup [F6]
-

T45 Display Contrast and Brightness

You can increase the LCD screen backlighting by holding down the [Cmd] key while simultaneously pressing the brown [+] key up to 4 times. Hold down the [Cmd] key and simultaneously press the [-] key up to 4 times to reduce the brightness.

In the same way, adjust the contrast using the [Cmd] and [down arrow] key to lighten the screen and [Cmd] [up arrow] to darken the screen.

[Cmd] [right arrow] increases speaker volume. [Cmd] [left arrow] decreases the speaker volume.

T45 Internal Modem

The T45 has a modem card option. When you insert the card, it electrically takes the place of the COM1 port at power up.

If the modem is installed, you need to type the following statements at the DOS prompt to use the COM1 port with the PLC3 software:

```
C:\> mode COM1:off,int  
C:\> mode COM1:on
```

This turns off the modem and powers up the COM1 port. Now, the software can use the COM1 port for printing and serial port communications.

To turn the modem back on, at the DOS prompt type:

```
C:\> mode COM1:off  
C:\> mode COM1:on, int
```

**Additional 6122
Information****KTK1 Address**

Change the KTK1 board address from the default of **0000110000** to **0100110000**, using [F2] - Online Configuration. Also, change the DIP switch settings on the KTK1 board. Refer to the 1784-KTK1 product data (publication 1784-2.3) for instructions.

**Additional IBM
XT Information****KTK1 Interrupt**

The XT has only one interrupt controller, therefore you can not use IRQ10 and IRQ12. The hard drive uses IRQ5, so you must use IRQ3.

Important: COM2 with a serial printer also uses IRQ3.

KTK1 Address

Since the XT does not have an AT slot, the 4 lower switches on the KTK1 board (7, 8, 9, and 10) should be ON, but you do not have to change the address (using [F2] - Online Configuration) from 0000110000.

Additional Information About the Software

This section contains additional information about the software.

- 1 New "Yes" and "No" confirmation keys are added to the software. When the software asks you for confirmation for an operation, you press [F8] for "Yes" or [F10] for "No". Formerly, "Yes" was the [F1] key and "No" was [F5].

- 2 New "Yes" and "No" confirmation key are also added when you change your processor to program or test mode. Previous releases only asked for confirmation when you changed to run mode.

- 3 To abort an operation use [Ctrl] [Z].

- 4 This information is important if you are using a 1784-T50 terminal.
 - . If you are trying to modify or create a message instruction, the instruction block does not display the message when the message field is entered until you press [F10] Accept Rung.
 - . If you are working with the data table section of the memory map, F3-outputs and F4-inputs, the mode defaults to octal instead of decimal. Address inputs are all interpreted as octal for file creates and file deletes. Changing the mode to decimal won't rectify this because when you enter the valid input, the mode automatically switches back to octal base. For example:

I9:9 gives an "INPUT INVALID" error even in decimal mode. To get this address I9:11 would have to be entered as input.
 - . In the message editor, when you have many procedure names in the directory, some of these names may appear in the directory more than once.

- 5 When you enter documentation, remember to save your files often using [F10] - Save and Continue.

Also, periodically backup your files to a different directory or to a floppy disk after adding or changing a significant amount of your program.

- 6** If you save memory areas E5 and E6, you must restore them to the same context they were saved from.
-
- 7** When viewing your ladder program, if you see ERR on the rung, re-enter this rung using the software and delete the ERR rung. Normally you will not see ERR on a rung. It only appears when the software cannot interpret the code in the processor.
-
- 8** The software does not allow you to enter a symbol for a label instruction.
-
- 9** The DOS print screen function is disabled in the software to prevent communication errors with the PLC-3 processor.
-
- 10** When connected over the Data Highway Plus network, clearing processor memory will cause a four-minute delay before the software returns to the menu system. You can reboot the computer to avoid waiting four minutes. Memory is still cleared.
-
- 11** When displaying a FIFO Load (FFL) or FIFO Unload (FFU) instruction, the software does not display the number of words used in the FIFO.
-
- 12** This information goes with chapter 16, Generate and Print Reports.
- When you use the [F6] - Create Reports function key from the 2nd menu, and then select [F5] - Report Options, there are three additional function keys for selecting how much information you want in your reports. You can select the all, one or a range of rungs, files or procedures to appear in the report.

12 (Cont'd)

Additional report options are available for these reports:

- . Program Listing
- . Cross Reference
- . Data Table
- . Memory Usage
- . Report Generation Procedures
- . Data Highway Procedures

First you select [F5] - Report Options. Then you press [F1] for the range. Here are your choices for these reports.

Program Listing

When you press [F1] - Rung Range, a new window in your display appears. You are asked to supply the starting and ending rungs you want in the report. Here are your options:

- | | |
|---------------------|--|
| [F2] - Select All | Select a ll to get all rungs in your ladder program in your Program Listing |
| [F3] - Single Rung | Specify a rung you want in your program listing. The rung you enter is displayed in the report options window as the starting and ending rung. |
| [F4] - Select Range | Enter the starting and ending rung numbers of the range of rungs you want in the Program Listing. |

Cross Reference, Data Table and Memory Usage

When you select the [F1] - File Range function key for these reports, a new window and three more function keys appear in your display. You are asked to enter starting and ending files. Here are your choices after you press [F1]:

- | | |
|---------------------|--|
| [F2] - Select All | Gives you all files in your report. A full report gives you files starting at #00 and ending at #S999. |
| [F2] - Single File | Enter the file number and it is displayed in the window as the starting and ending file |
| [F3] - Select Range | Enter the starting and ending files of the range for the report. |

12 (Cont'd)**Report Generation Procedures, Data Highway Procedures**

When you select [F1] - Proc Range for these two reports, a new window and three additional function keys appear in the display. You are asked to enter starting and ending procedure names for the report. You can select:

[F2] - Select All	Gives you all procedures in your program in your report.
[F3] - Single Proc	Enter the procedure name you want in the report and it appears in the window as starting and ending procedure.
[F4] - Select Range	You select the starting and ending range of the procedures to include in the report. You do not need to enter the @ before the procedure name.

13

For Serial Printers only:

If the baud rate that you specified in "Printer Configuration" does not match your printer's baud rate, the software locks up when you print a report or listing. To continue, you must press [CTRL] [Z] and cycle printer power.

14

The software does not allow you to create or delete memory area 6 symbols except those associated with report generation procedures and Data Highway procedures.

15

When forcing instructions:

You cannot force output addresses on input instructions.

You cannot force input addresses on output instructions.

Chapter Objectives

In this chapter, you will read about the changes that were made to the editing functions with version 2.0 software:

- . Cursoring in Ladder Editor
 - on input line
 - between rungs and instructions
 - between pages
 - . Moving between rungs
 - . Multiple instruction and address entry
 - . Edit Buffer function
 - . Auto Document configuration
 - . Entering and modifying symbols
-

Cursoring in Ladder Editor

Several features have been added to the editing screens to give you more flexibility. Each is explained below.

Input Line Cursoring

When you are editing, you can now cursor to the left and right on the input line using the left and right arrow keys. Control keys are no longer required. Also, you can use the Delete key to delete characters from the command line and the Insert key to toggle between insert mode and overstrike mode while typing on the command line. If you select overstrike mode, you will type over the existing characters. If you select insert mode, any characters that you type will be inserted at the cursor position and the existing characters will move to the right.

Cursoring Between Rungs and Instructions

You can now use up, down, left and right arrow keys to position the cursor on the program location you wish to edit.

The up arrow and down arrow keys move you between branching levels of instructions. The Control-page up key and the Control-page down key move from one rung to another.

Cursoring Between Pages

Use the Page-Up and Page-Down keys to move through rungs a page at a time.

Moving Between Rungs

You can move quickly to different parts of your program just by specifying the section and rung number.

For example, if you wanted to move to rung 5 of the Main portion of your program, type M4 on the command line (rung numbers start at 0). The cursor will then move to the fifth rung. Likewise, use S and the rung number for the subroutine section and F and the rung number for the Fault section of your program.

Multiple Instruction and Address Entry

You can enter multiple instructions and addresses on the command line.

Type the instruction, a comma or a blank space, and then the address. You can continue to enter several instructions and the corresponding addresses on the command line by using a comma or a blank space to separate them.

When you are entering an instruction/address (or multiple instructions/addresses) you can assign a **symbol** to it at the same time. On the command line, type the address, an "@" sign, and the symbol. The symbol will then be assigned to that address.

Edit Buffer

Use the Edit Buffer function to save time while entering instructions of your program. This function copies an existing instruction to the command line so that you can make minor changes and re-enter it as a new instruction.

Position the cursor on the instruction you would like to re-use and press [ALT] [B]. The instruction is copied to the command line. You can now use the arrow keys to move within the command line and make changes.

Auto Document

The Auto Document option lets you document an instruction or rung immediately after it is entered.

To activate this function, press F2 from the Ladder Editor Main Menu. Then, from the Configure Ladder Editor Menu, press F6.

With Auto Document active, the system takes you directly to the address comment window or the rung comment window whenever you enter an instruction or rung that does not have comments.

Also, if Auto Document is active and you enter an address that does not have a **symbol**, a message will appear on the screen prompting you to enter a symbol. Type the symbol and press [Enter]. If you do not want to use a symbol for that address, press [Esc].

Symbols

When assigning symbols to multi-address block instructions, use the following keys to move within the block instruction:

[F7], [F8] - Next/Previous Address

[F9], [F10] - Next/Previous Instruction

Chapter Objectives

In this chapter, you will read about the changes that were made to the File Options with version 2.0 software:

- . Merge function
- . Transfer function

Merging Documentation Files

You can merge documentation files through the File Options Utility.

To merge files, do the following:

1. Start on the main menu.
2. Press [F7] - File Options.

The system displays the File Options screen.

3. Press [F8] - Merge Doc.

The system displays the Merge Screen.

PLC-3 PROGRAMMING SOFTWARE		PROCESSOR
A 6200 Series Software Product		STATION4
Copyright 1986, 1987, 1988, 1989, Allen-Bradley Company All Rights Reserved		
Release 2.0		
This software is licensed to: Company Allen-Bradley Location PC Division		
MERGE COMMENTS AND SYMBOLS SOURCE: DESTIN: ESC exits		

Press a Function Key or Enter File Name

>

Begin
Oper
F1

Select
Source
F3

Select
Destin
F4

Select
Options
F5

Define
Dir
F7

Merge Documentation Screen

4. Press the soft-function key for the task you want to perform.

You can perform the following tasks from the Merge screen:

Key:	Function:
[F1] - Begin Operation	Starts the merge function for the specified files.
[F3] - Select Source	Selects the source for the merge operation.
[F4] - Select Destination	Selects the destination for the merge operation.
[F5] - Select Options	Lets you configure the merge operation.
[F7] - Define Directory	Lets you define the directories where processor memory, comment and symbols, exported comments and symbols, documentation reports, user configuration files are stored.

Configuring the Merge Function

You can specify how you want the merge function to work by configuring the function. To configure the merge function, do the following:

1. Start on the Merge screen.
2. Press [F5] - Select Options.

The system displays the Configure Merge screen.

PLC-3 PROGRAMMING SOFTWARE

A 6200 Series Software Product

Copyright 1986, 1987, 1988, 1989, Allen-Bradley Company
All Rights Reserved

PROCESSOR
STATION4

This software

MERGE OPTIONS

F1 On Collisions
F5 Symbols
F6 Address Comments
F7 Instruction Comments
F8 Runq Comments
F10 Select Range
F9 Save Configuration

DISCARD
MERGE
MERGE
MERGE
MERGE
00 - S999

ESC exits/ALT-U aborts changes

Press a function key.
>

on
Collisn
F1

Symbols
F5

Address
Comments
F6

Instr'n
Comments
F7

Runq
Comments
F8

Save
Config
F9

Select
Range
F10

3. Press the soft-function key for the characteristic the Merge Function you want to change.
4. Press [F9] - Save Configuration to save the changes.

This saves the configuration characteristics you specified on this screen only. If you make changes on other configuration screens, you must save the configuration on those screens if you want the configurations saved to your user configuration file.

After you press [F9], the configuration information remains the same each time you start the software.

If you want to change the configuration information for this editing session only, press [ENTER] after you change the appropriate information. The changes remain until you exit the software.

You can change the following merge characteristics:

Key:	Function:
[F1] - On Collision	Toggles between Overwrite and Discard for when the files you merge have the same piece of data.
[F5] - Symbols	Toggles between Merge and No Merge.
[F6] - Address Comments	Toggles between Merge and No Merge.
[F7] - Instruction Comments	Toggles between Merge and No Merge.
[F8] - Rung Comments	Toggles between Merge and No Merge.
[F9] - Save Configuration	Saves the configuration you specify.
[F10] - Select Range	Selects the range of files to be merged.

Transferring Files

You can transfer disk files to and from any directory and to and from SB (tape). To transfer files, do the following:

- 1. Start on the main menu.
- 2. Press [F7] - File Options.

The system displays the File Options screen.

- 3. Press [F9] - Transfer.

The system displays the Transfer Selection screen.

PLC-3 PROGRAMMING SOFTWARE

A 6200 Series Software Product

Copyright 1986, 1987, 1988, 1989, Allen-Bradley Company, Inc.
All Rights Reserved

TRANSFER

F1 Transfer from Current 6200 Directory to Drive:Directory

F2 Transfer from Drive:Directory to Current 6200 Directory

F3 Transfer from SB to Processor File

F4 Transfer from Processor File to SB

ESC exits

Press a function key

Transfr Fr 6200 F1

Transfr To 6200 F2

SB to Disk F3

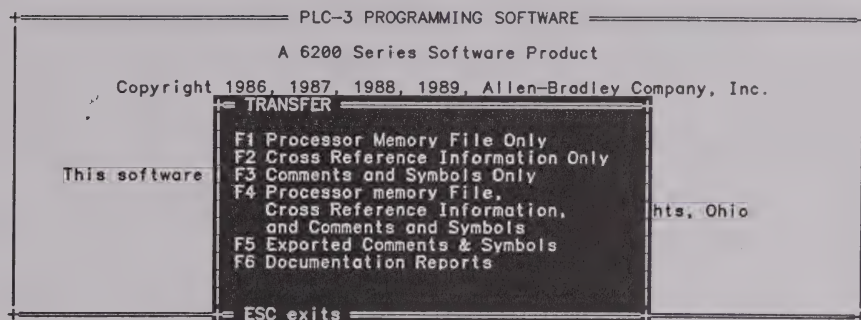
Disk to SB F4

Transfer Selection Screen

Transferring Files To/From a Directory

1. Start on the Transfer Selection screen.
2. Press either [F1] - Transfer To 6200 or [F2] - Transfer From 6200.

The system displays the Transfer screen.



Press a function key

Proccsr Memory	Cross Refrnce	Commnts Symbols	All F1,2,3	Xported Cmt/sym	Docu Reports
F1	F2	F3	F4	F5	F6

Transfer Screen

You can transfer the following types of files from the Transfer screen.

Key:	Function:
[F1] - Processor Memory	Specifies the processor memory file.
[F2] - Cross Reference	Specifies the cross reference file.
[F3] - Comments and Symbols	Specifies the comments and symbols file.
[F4] - Processor Memory, Cross Reference, Comments and symbols	Specifies all of the above files.
[F5] - Exported Comments and Symbols	Specifies the exported comments and symbols file.
[F6] - Document Reports	Specifies the document reports file.

Transferring to Another Directory

To transfer a file to another directory, do the following:

1. Start on the Transfer screen.
2. Press [F1] - Transfer To 6200.

The system displays the Transfer screen.

3. Press the soft-function keys for the type of file you want to transfer.

The system asks you to specify the file you want to transfer.

4. Specify the file you want to transfer by doing one of the following:

- . Type the name of the file and press [ENTER].
- . Place the cursor on the file.

5. Press [F3] - Select Source.
6. Press [F4] - Enter Path.

The system prompts you for the path.

7. Type the path for where you want to transfer the file and press [ENTER] or [ESC]. You specify a path in the same way you specify a DOS path name. If you do not specify a disk drive, the transfer operation defaults to the current drive.

8. Press [F1].

The system transfers the specified file to the specified directory path.

Transferring from a Directory

To transfer a file from a directory, do the following:

1. Start on the Transfer screen.
2. Press [F2] - Transfer From 6200.

The system displays the Transfer screen.

3. Press the soft-function key for the type of file you want to transfer.

The system asks you for the name of the file you want to transfer.

4. Type the name of the file that you want to transfer (without the extension) and press [ENTER] or [ESC]. If you do not specify a disk drive, the transfer operation defaults to the current drive.

5. Press [F1].

The system transfers the file from the directory you specified to the current directory.

Transferring Files to/From SB

SB to Disk

1. Start on the Transfer Selection screen.
2. Press [F3] - SB to Disk.

The system displays the SB to Disk screen.

PLC-3 PROGRAMMING SOFTWARE	
A 6200 Series Software Product	
Copyright 1986, 1987, 1988, 1989, Allen-Bradley Company, Inc. All Rights Reserved	
Release 2.0	
This software is licensed to:	Company Allen-Bradley Location PC Division Highland Heights, Ohio
FILE	
File Name:	

Press a Function Key or Enter a File Name.

>

**Begin
Oper**
F1

SB to Disk Screen

3. At the Enter filename prompt, type the name of the disk file to receive the transferred tape data.
4. Press [F1] - Begin Operation.

The system will transfer the file from SB to disk.

Disk to SB

To transfer a file from disk to SB, do the following:

1. Start on the Transfer Selection screen.
2. Press [F4] - Disk to SB.

The system displays the following screen:

PLC-3 PROGRAMMING SOFTWARE

A 6200 Series S

Copyright 1986, 1987, 1988, 19

All Rights

Release 2.0

This software is licensed to: Comp
Loca

Name	Size	Date
QBTESTR1	15401	10-31-88
STATIONS	1609	12-29-88
TESTBED1	11107	08-08-88

FILE _____

File Name: _____

Logical Format /

Press a Function Key or Enter a File Name
>

Begin
Oper
F1

Select
File
F3

Define
Dir
F7

Select
Format
F8

Disk to SB screen

The following functions are listed on the Disk to SB screen.

Key:	Function:
[F1] - Begin Operation	Starts the Transfer function
[F3] - Select File	Selects the file to be transferred
[F7] - Define Directory	Allows you to choose the directory to which the file is transferred
[F8] - Select Format	Toggle between the .ARC, .ACH, or .PHY format for the file to be transferred

3. Press [F7] - Define Directory to specify the path for the file to be transferred.
4. Press [F8] - Select Format to toggle between the .ARC, .ACH, and .PHY file formats.
5. Press [F3] - Select File.
6. Press [F1] - Begin Operation.

Chapter Objectives

In this chapter, you will read about the changes that were made to the Report Generation function with version 2.0 software:

- . Viewing reports without printing
- . Creating reports
- . Defining directory paths in report generation
- . Variable report width and length

Creating/Viewing Reports

You can view reports on the screen before you send them to the printer. This is useful if the report directory contains several reports and you want to make sure you print the report you want.

To view a report, perform the following steps:

1. Start on the main menu.
2. Press [F8] - Print/View.

The system displays the Select Processor screen.

3. Specify the processor you want to use.

You can specify a processor by either of the following methods:

- . Type the name of the processor and press [ENTER].
- . Place the cursor on the processor name.

4. Press [F3] - Select.

The system displays the Print Reports screen. Move the cursor to the file you wish to view or create.

5. To view a file, press [F10] - View Files. The system displays the report you selected. Use [Pageup] and [Pagedown] to look at the file.

To create a report, press [F1] - Create Report. The system will begin printing the report.

Defining Directory Paths

You can define the paths where you want the system to store the following files: Documentation Reports, Exported comments and symbols, and User configuration. Refer to the System Configuration section of Chapter 2 for more information on defining directory paths.

NOTE: While creating reports, you **cannot** change the directory paths for processor memory, comments and symbol files. These files will be stored in \IPDS\ARCH\PLC3.

***Variable Report
Width and Length***

You now have greater flexibility in defining page lengths and widths when creating reports.

To select the width of the report, perform the following steps:

1. From the General Listing Options Menu, press F7.
2. Enter any width between 80 and 255 characters.

To select the length of the report, perform the following steps:

1. From the General Listing Options Menu, press F8.
2. Enter any length between 60 and 255 characters.

Smart Menu

The Smart Menu provides a common interface for the PLC-3 programming software and any other software packages installed on your machine. You access the software packages by selecting an option from the Smart Menu.

The Smart Menu can consist of up to ten pages of executable applications, each one assigned to a function key for the screen the application is on. F10 is always reserved for Exit to DOS. You use [Pageup] and [Pagedown] to page through the screens.

For example, one screen of the Smart Menu can look like the following:

ALLEN BRADLEY MAIN MENU INTERFACE	
Copyright 1988, 1989, Allen-Bradley Company, Inc. All Rights Reserved	
F1 F2 F3 F4	PLC-2 Programming Software PLC-3 Programming Software PLC-5 Programming Software DH+ Network Menu
[LEVEL 0]	
Thur Dec 29, 1988	
8:14:00 am	

Press a function key to select a program or ALT-C to modify entries.

PLC-2	PLC-3	PLC-5	DH+
Prog	Prog	Prog	Net
F1	F2	F3	F4

Exit
To DOS
F10

Example of the Smart Menu

You can add and modify selections on the Smart Menu interactively through a menu system. You must supply the following information:

- Menu Level - The page on which the change goes (0-9)
- Key Number - The soft-function key (0-9) you want to assign to the new entry
- Top Function Key Label - The first line of the label (1-7 characters) you want to appear above the soft-function key
- Bottom Function Key Label - The second line of the label (1-7 characters) that you want to appear above the soft-function key
- Application Description - The description of the entry (1-10 characters) that you want to appear on the menu
- Path - The path (1-51 characters) to where the executable for the application is stored
- Application Name - The name (1-8 characters) of the executable file for the application
- Command Line Parameters - Any instructions (1-70 characters) for information that you want a user to type at the DOS command line after selecting the entry.

When you specify the executable for the application, include the full path and extension for the fastest execution time. If you do not include the full path, the software uses the path in your AUTOEXEC.BAT to find the executable. If you do not use the extension, the software looks for the executable with the following extensions:

Search Order:	Extension:
First	.COM
Second	.EXE
Third	.BAT

Starting the Smart Menu

To start the Smart Menu, do the following:

1. Make sure ABMENU.EXE is in the C:\IPDS directory.
2. Do one of the following:
 - Place c:\IPDS\ABMENU as the last line in your AUTOEXEC.BAT file.
 - Change the directory to \IPDS, type ABMENU, and press [ENTER].

Now you can modify the selections that appear on the Smart Menu to reflect the software you use.

Modifying the Smart Menu

You can modify the Smart Menu interactively by pressing [ALT] [C] when you are on the Smart Menu. To use the Smart Menu Configuration screen, do the following:

1. Use [PageUp] and [PageDown] to move to the page of the Smart Menu where you want to add or change a selection.
2. Place the cursor on the item you want to add or change.
3. Press [ALT] [C].

The system displays the Smart Menu Configuration screen:

```

      ALLEN BRADLEY MAIN MENU INTERFACE
    -----
    MENU CONFIGURATION
    -----
    1  PLC-2 Programming Software
    2  PLC-3 Programming Software
    3  PLC-5 Programming Software
    4  DH+ Network Menu
    5
    6
    7
    8
    9

    [ LEVEL 0 ]
    Thur Dec 29, 1988      8:15:07 am
  
```

Press a function key.

Delete
Entry
F1

Modify
Entry
F3

Add
Entry
F5

Move
Entry
F7

4. Press the soft-function key for the modification you want to perform. You can delete, add, modify, or move an entry.

The system displays the appropriate menu for the task you selected.

The input keys you use for configuring the Smart Menu are the same input keys you use in the programming software. For description of these keys, refer to Chapter 2.

You can perform the following configuration tasks on the Smart Menu:

If You Want to:	Press This Key:
Delete an existing entry	[F1] - Delete Entry
Modify an existing entry	[F3] - Modify Entry
Add an entry	[F5] - Add Entry
Move an existing entry to different location	[F7] - Move Entry

Appendix A

Bit Instructions

Examine Input Closed XIC

—] [—————

Examine Input Open XIO

—]/[—————

Output Energize OTE

—————()—

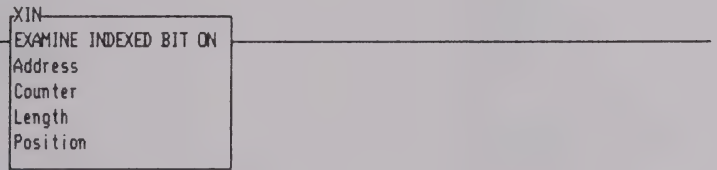
Output Latch OTL

—————(L)—

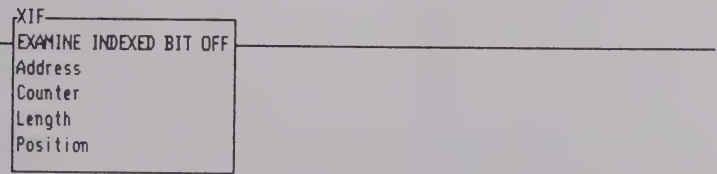
Output Unlatch OTU

—————(U)—

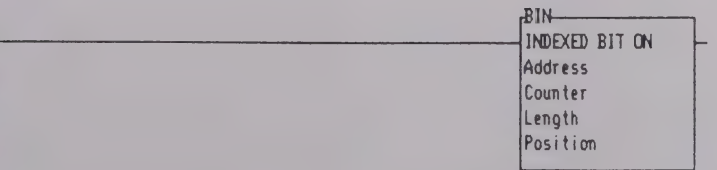
Examine Indexed Bit On XIN



Examine Indexed Bit Off XIF

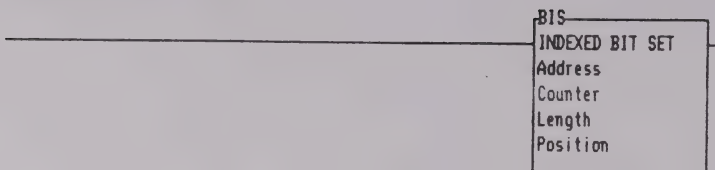


Indexed Bit On BIN

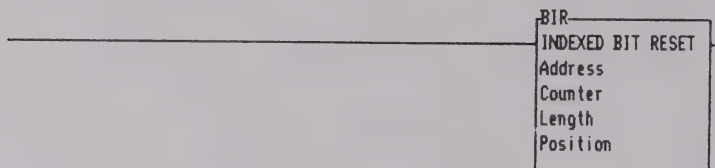


Bit Instructions - continued

Latched Indexed Bit BIS

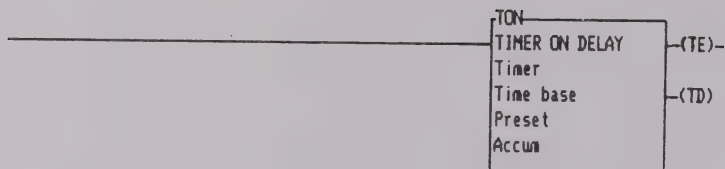


Unlatched Indexed Bit BIR

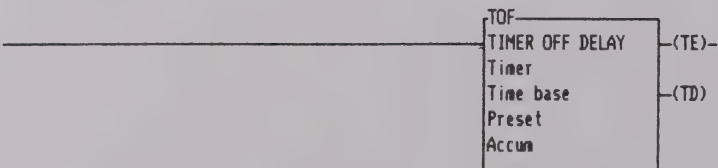


Timer/Counter Instructions

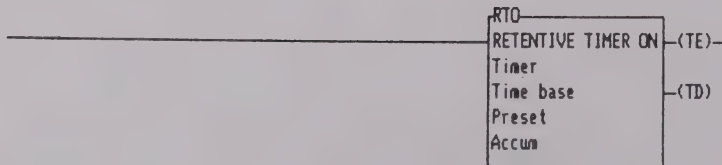
Timer On Delay TON



Timer Off Delay TOF

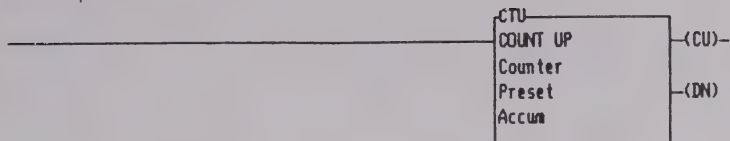


Retentive Timer RTO

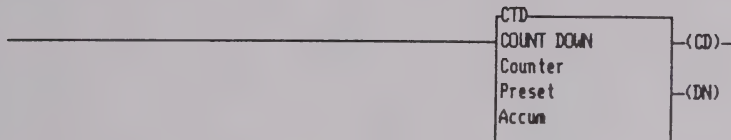


Timer/Counter Instructions - continued

Count Up CTU



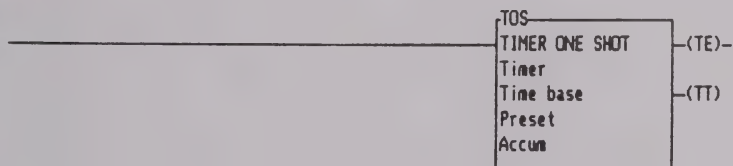
Count Down CTD



Timer/Counter Reset RES

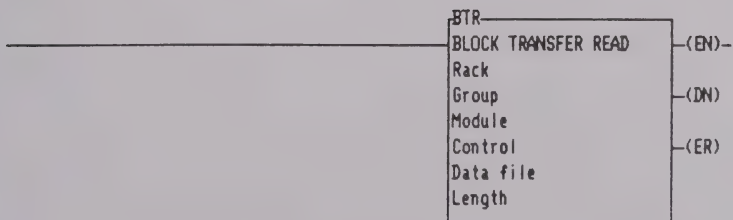


Timer One Shot TOS

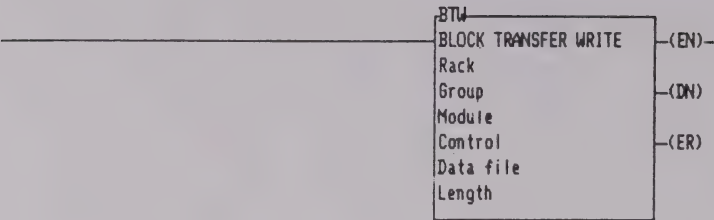


I/O & Message Instructions

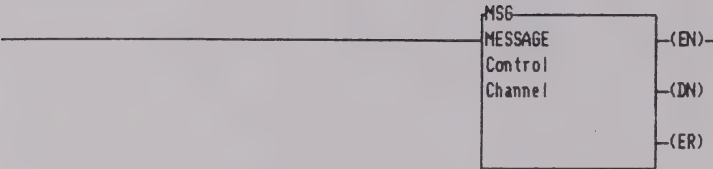
Block Transfer Read BTR



Block Transfer Write BTW

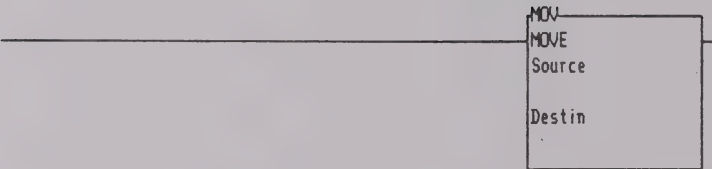


Message MSG

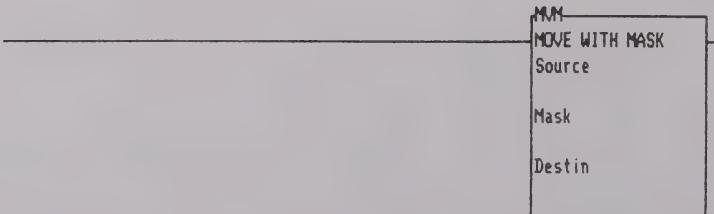


Move/Compare Instructions

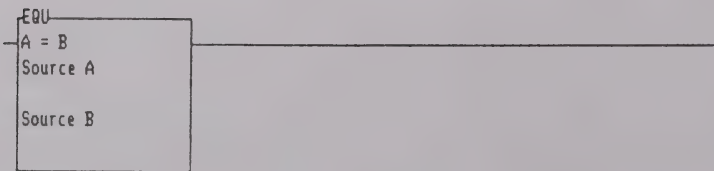
Move MOV



Move File With Mask MVM

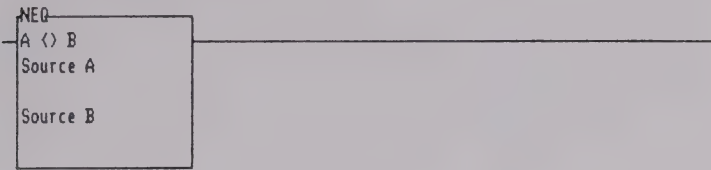


Equal EQU

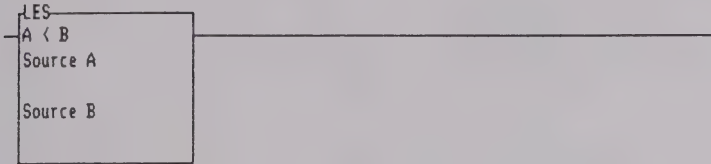


Move/Compare Instructions - continued

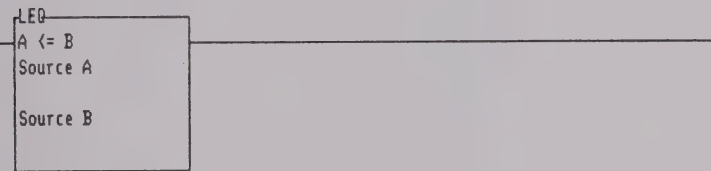
Not Equal NEQ



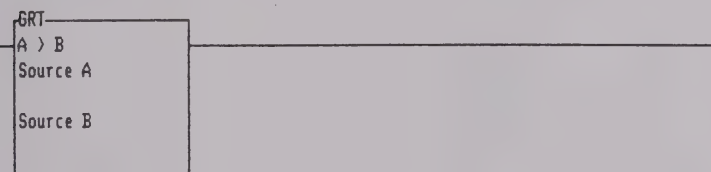
Less Than LES



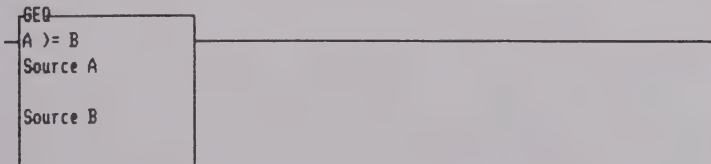
Less Than or Equal LEQ



Greater Than GRT

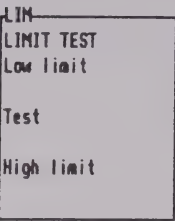


Greater Than or Equal GEQ

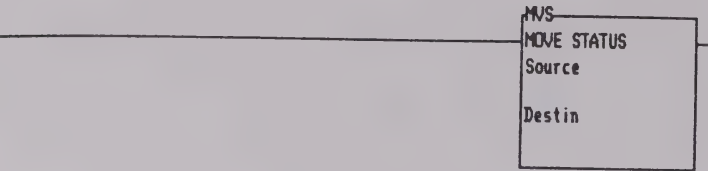


Move/Compare Instructions - continued

Limit Test (circular) LIM

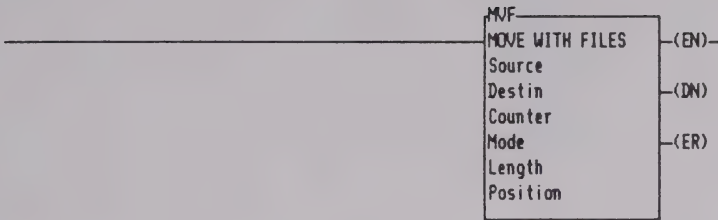


Move Status MVS

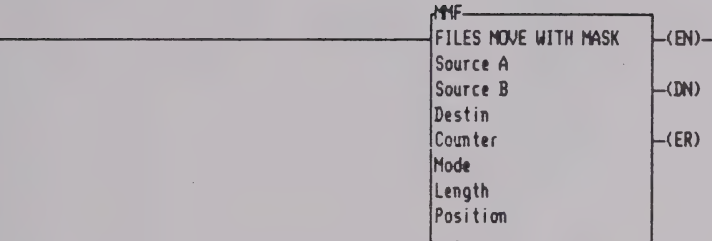


File/Search Instructions

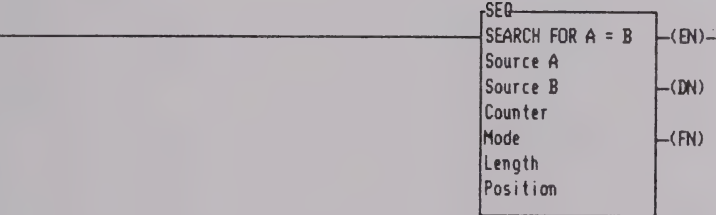
Move File MVF



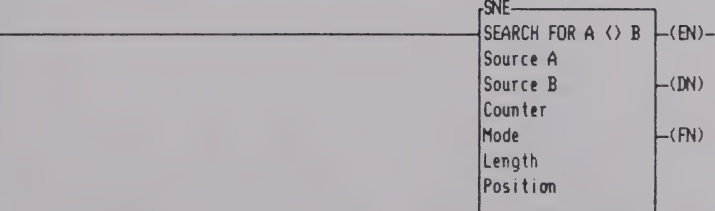
Files Move With Mask MMF



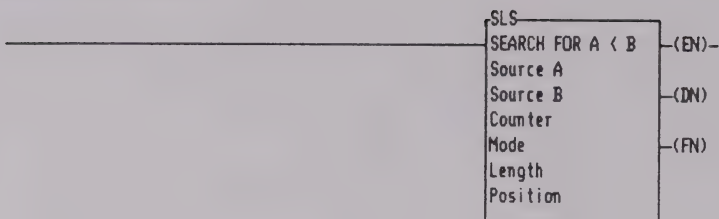
Search Equal SEQ



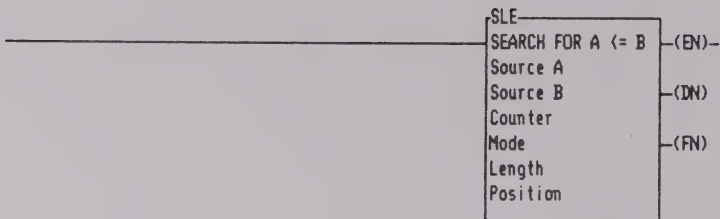
Search Not Equal SNE



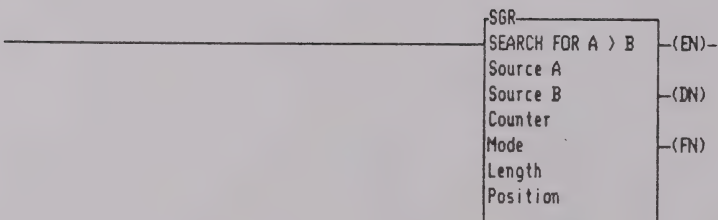
Search Less Than SLS



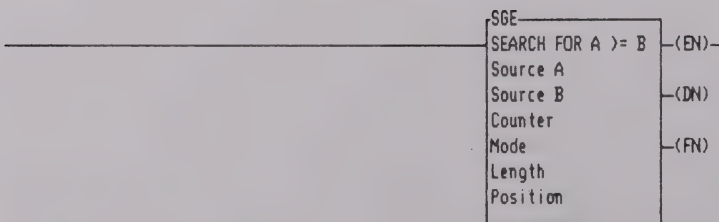
Search Less Than or Equal SLE



Search Greater Than SGR

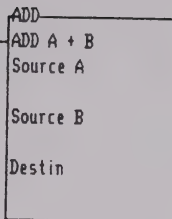


Search Greater Than or Equal SGE

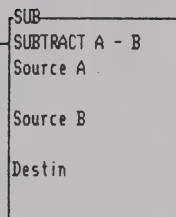


Math/Logical Instructions

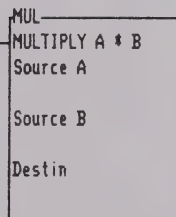
Add ADD



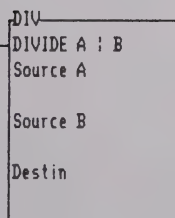
Subtract SUB



Multiply MUL

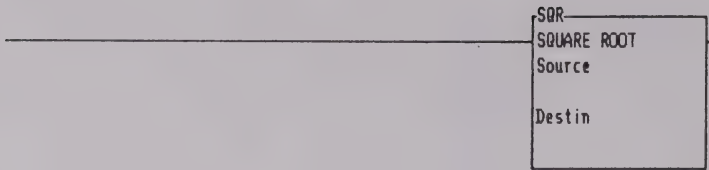


Divide DIV

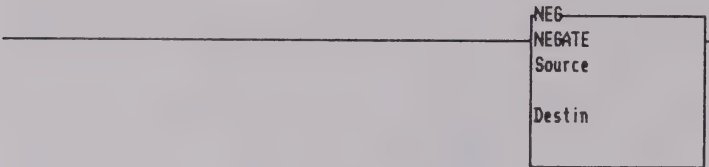


Math/Logical Instructions - continued

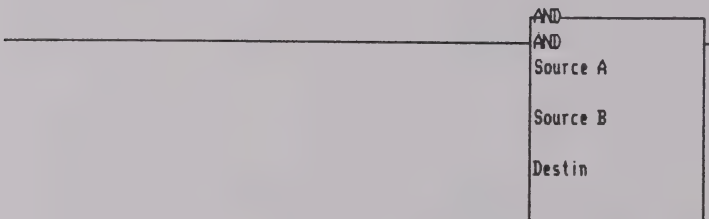
Square Root SQR



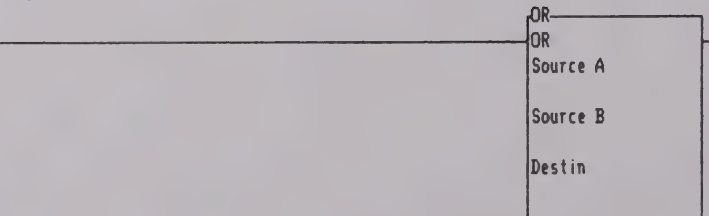
Negate (2's complement) NEG



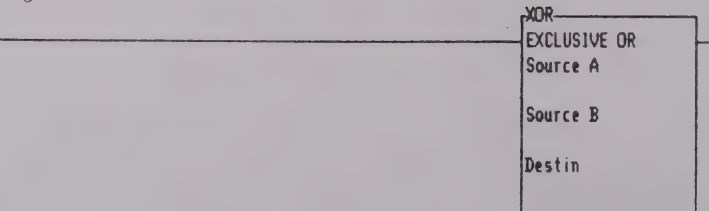
Logical AND AND



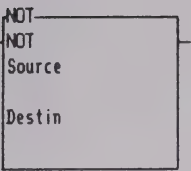
Logical OR OR



Logical Exclusive OR XOR

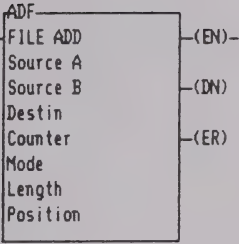


Not (1's complement) NOT

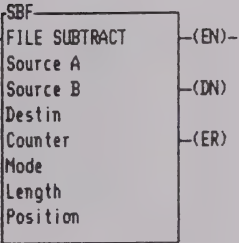


File/Math Instructions

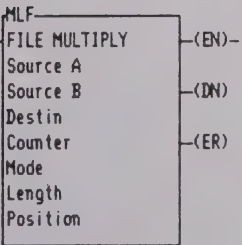
File Add ADF



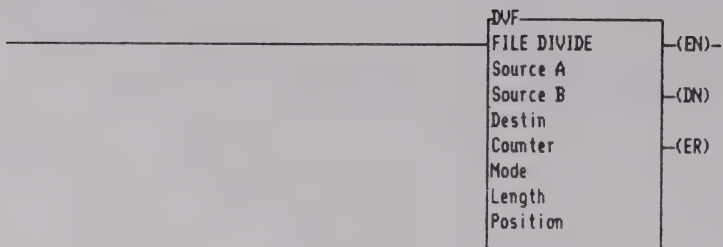
File Subtract SBF



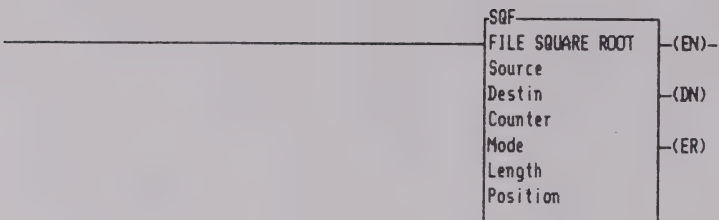
File Multiply MLF



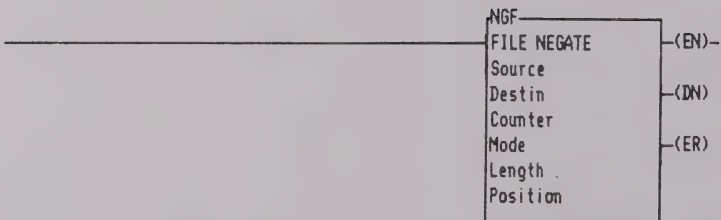
File Divide DVF



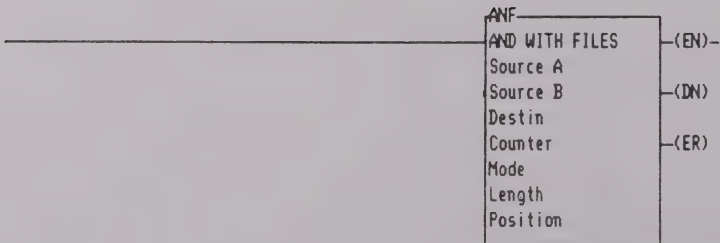
File Square Root SQF



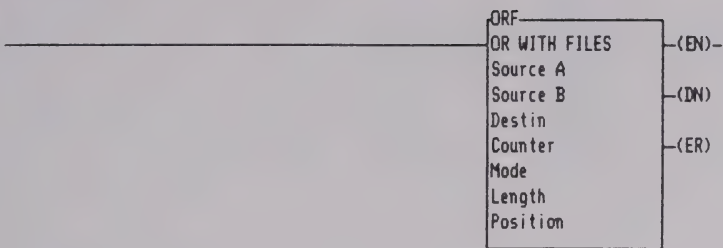
File Negate (2's complement) NGF



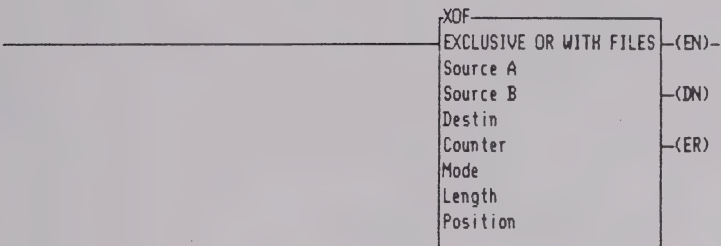
AND With Files ANF



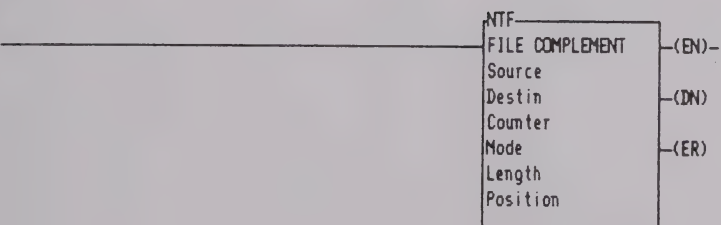
OR With Files ORF



Exclusive OR With Files XOF

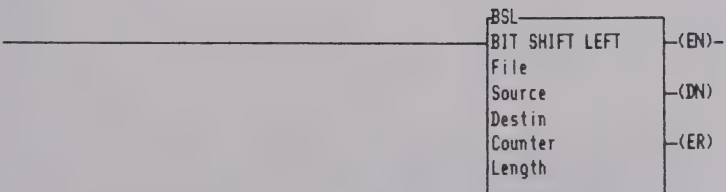


File Complement (1's complement) NTF



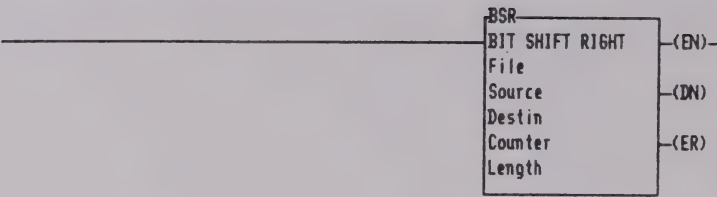
Register Instructions

Bit Shift Left BSL

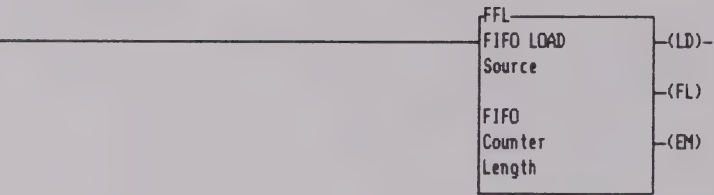


Register Instructions - continued

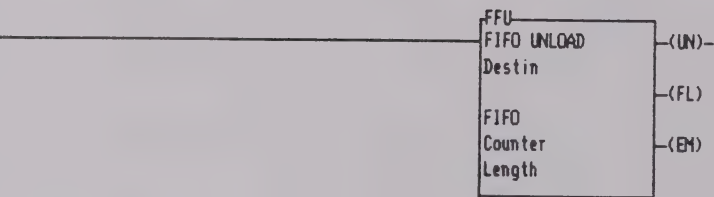
Bit Shift Right BSR



FIFO Load FFL



FIFO Unload FFU



Control Instructions

Jump to Label JMP



Label LBL



Jump to Subroutine JSR



Return from Subroutine RET



Control Instructions - continued

End END

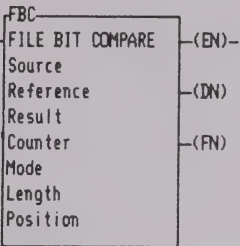
(END)-

Master Control Reset MCR

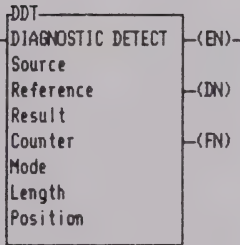
(MCR)-

Special Instructions

File Bit Compare FBC



Diagnostic Detect DDT



No Operation NOP

(NOP)-

If you see this message:	It means:
THIS KEY IS NOT CURRENTLY ACTIVE	the last key you pressed is not activated at this time.
THIS FUNCTION IS NOT YET IMPLEMENTED	the last function you attempted is not implemented in this revision of the software.
DATA REQUIRED BEFORE <RETURN> KEY	you did not enter required information at the prompt line.
ILLEGAL CHARACTER SPECIFYING THE DATA TYPE	the character you entered to specify a data type was invalid.
NUMERIC VALUE OUT OF LEGAL RANGE	the value you entered is out of the legal range for this operation.
EXTRA CHARACTERS ON THE LINE	you entered too many or irrelevant characters at the prompt line.
INTEGER IS TOO LARGE	the integer you entered is out of the legal range or contains too many digits.
ILLEGAL RADIX SPECIFIED	you entered an illegal radix for specifying a data type.
ILLEGAL OR MISSPELLED FIELD NAME	you used an invalid field name or misspelled the name of the field you want to view.
NO MORE DATA	the program file or data file you are accessing contains no more data.
BAD SEARCH STRING	the character string you entered for a search is of incorrect format.
OPERAND/ADDRESS NOT FOUND	the operand or address you are searching for does not exist in this file.
AT TOP OF PROGRAM	the cursor is on the first rung of the program.

If you see this message:	It means:
AT BOTTOM OF PROGRAM	the cursor is on the last rung of the program.
AT START OF RUNG	the cursor is at the first position (the left power rail) on a rung.
AT END OF RUNG	the cursor is at the last position (the right power rail) on a rung.
NOT A DIRECT ADDRESS	the address you entered is an indirect address.
INSTRUCTION HAS NO OPERANDS	you tried to select for data monitor an instruction with no operands.
NOT A RELAY INSTRUCTION	you tried to force a bit that is not a real input or output bit.
ADDRESS IS NOT FORCIBLE	you attempted to force a bit that cannot be forced. Only real input and output bits can be forced.
ADDRESS IS NOT SPECIFIED TO THE BIT LEVEL	you entered the address to the word level. You must specify this address to the bit level.
ADDRESS IS NOT SPECIFIED TO THE WORD LEVEL	you entered the address to the file or bit level. You must specify this address to the word level.
ADDRESS IS NOT SPECIFIED TO THE FILE LEVEL	you must specify this address to at least the file level.
ADDRESS IS NOT SPECIFIED TO THE STRUCTURE LEVEL	you must specify this address to at least the structure level.

If you see this message:	It means:
LOGICAL ADDRESS IS NOT ALLOWED	the logical address you entered is not allowed for this operation. Enter a number.
INVALID OPERAND	the operand you specified is invalid for as input.
ILLEGAL INSTRUCTION MNEMONIC	the instruction mnemonic you entered does not exist.
ALL REQUIRED OPERANDS HAVE NOT BEEN ENTERED	this instruction requires additional operands before it will be valid.
CANNOT CURSOR OFF THE CURRENT RUNG	you must finish editing this rung by pressing DO [+] before you can leave the rung.
CANNOT MODIFY THIS INSTRUCTION	the instruction the cursor is on cannot be modified.
CANNOT DELETE THIS INSTRUCTION	the instruction the cursor is on cannot be deleted.
NO INSTRUCTION HAS YET BEEN DELETED	you pressed UNDELETE INSTRUCTION without first deleting an instruction. There is no previously deleted instruction in the delete buffer.
CANNOT EDIT THIS RUNG	you are at the End of File marker.
NO RUNG HAS YET BEEN DELETED	you pressed UNDELETE RUNG without first deleting a rung. There is no previously deleted rung in the delete buffer.
NOT INSIDE A BRANCH	you pressed DELETE BRANCH while the cursor was not on a branch.
NO BRANCH HAS YET BEEN DELETED	you pressed UNDELETE BRANCH without first deleting a branch. There is no previously deleted branch in the delete buffer.

If you see this message:	It means:
INSTRUCTION NOT ALLOWED IN THIS POSITION	the instruction you entered cannot occupy this position on the rung.
NO BRANCH TARGETS EXIST AT CURRENT LOCATION	you cannot start and end a branch with the cursor at this location.
ADDRESS ALREADY EXISTS	you attempted to create an address that has already been created.
ADDRESS DOES NOT EXIST	the address you specified does not exist in PLC__3 memory.
SYMBOL NOT FOUND	the symbol you are searching for is not present in this program.
SYMBOL IS ZERO OR >8 CHARACTERS	the file name you specified must contain at least one and no more than eight characters.
ILLEGAL SIZE	the size of the file you specified is illegal.
NO ACCESS OR PRIVILEGE VIOLATION	you do not have access or are not privileged to perform the specified function.

Cable Pinouts

Cable #1

9-SKT 25-SKT
IBM AT 1770-KF2

RXD 2 ————— 2
GND 5 ————— 7

TXD 3 ————— 3

DCD 1 ————— 4 RTS
DTR 4 ————— 5 CTS
DSR 6 —————

RTS 7 ————— 6 DSR
CTS 8 ————— 8 DCD
20 DTR

Cable #2

25-SKT 25-SKT
IBM XT 1770-KF2

TXD 2 ————— 3
GND 7 ————— 7

RXD 3 ————— 2

RTS 4 ————— 4 RTS
CTS 5 ————— 5 CTS

DSR 6 ————— 6 DSR
DCD 8 ————— 8 DCD
DTR 20 ————— 20 DTR

Cable #3

9-SKT 25-SKT
Computer 1770-KF2

TXD 2 ————— 3
GND 7 ————— 7

RXD 3 ————— 2

RTS 4 ————— 4 RTS
CTS 5 ————— 5 CTS

DSR 6 ————— 6 DSR
DCD 8 ————— 8 DCD
DTR 9 ————— 20 DTR

Cable #4

9-SKT 25-pin
IBM AT Modem

DCD 1 ————— 8
RXD 2 ————— 3
TXD 3 ————— 2
DTR 4 ————— 20
GND 5 ————— 7
DSR 6 ————— 6
RTS 7 ————— 4
CTS 8 ————— 5
RNG 9 ————— 22
CASE ————— 1

Cable #5

9-SKT 25-pin
Computer Modem

RNG 1 ————— 22
TXD 2 ————— 2
RXD 3 ————— 3
RTS 4 ————— 4
CTS 5 ————— 5
DSR 6 ————— 6
GND 7 ————— 7
DCD 8 ————— 8
DTR 9 ————— 20

Cable #6

25-SKT 25-pin
Computer Modem

CHS 1 ————— 1
TXD 2 ————— 2
RXD 3 ————— 3
RTS 4 ————— 4
CTS 5 ————— 5
DSR 6 ————— 6
GND 7 ————— 7
DCD 8 ————— 8
DTR 20 ————— 20

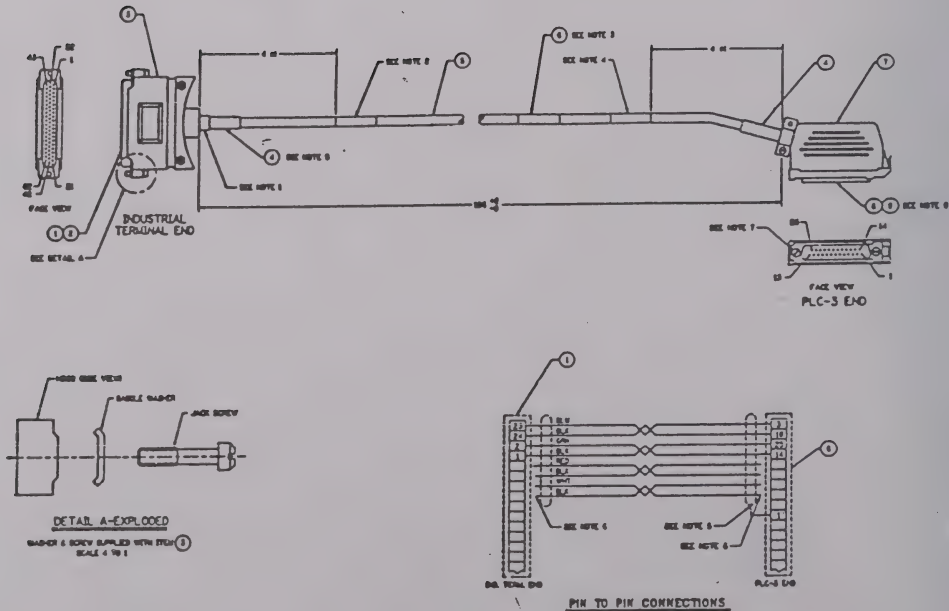
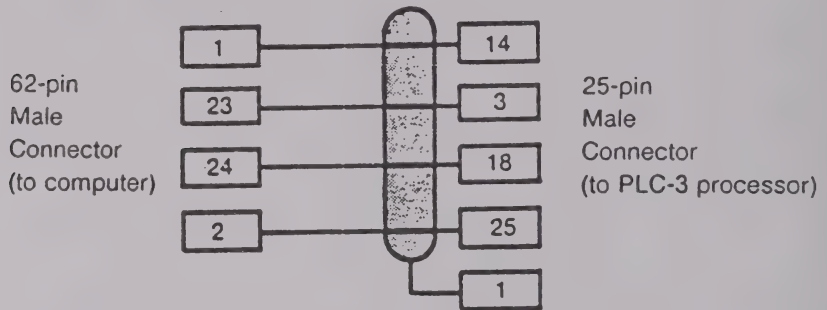
1784-CP3

Use a 1784-CP3 cable (or 1775-CAT cable and a 1784-AG3) adapter to connect the 1784-KTP module to any of these PLC-3 modules:

- 1775-S4A
- 1775-GA
- 1775-RM*
- 1775-S5
- 1775-SR (PLC-3/10) via front panel
- 1775-SR5 (PLC-3/10) via front panel

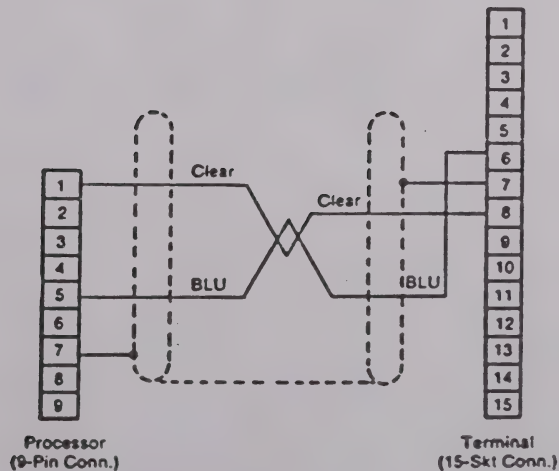
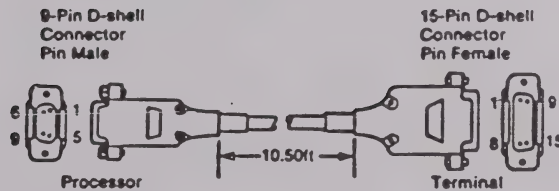
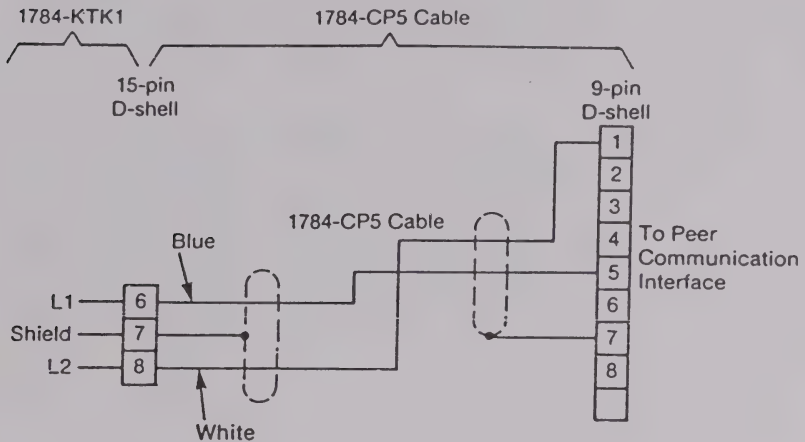
* You need Series A, Rev. F of the 1775-RM module.

Cable pin-outs for 1784-CP3 cable.



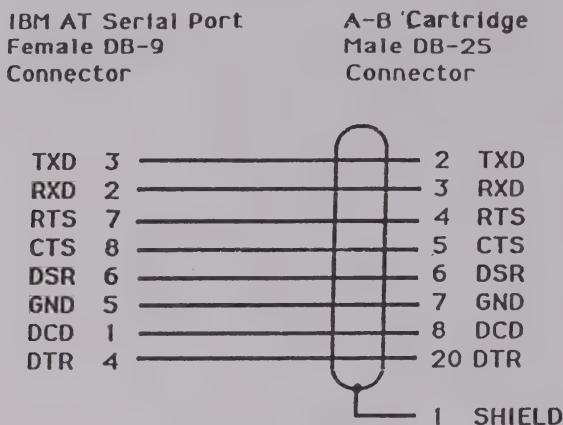
1784-CP5

The next drawings show the connections (pinouts) for the 1784-KTK1 D-shell connector and the 1784-CP5 cable. Use this cable to connect from the KTK1 to the 1775-S5 or 1775-SR5 for communicating over Data Highway Plus.



1784-CAS

The pin connections for an RS232-C cable used to interface the IBM AT serial port to the Allen-Bradley cartridge recorder is shown below.

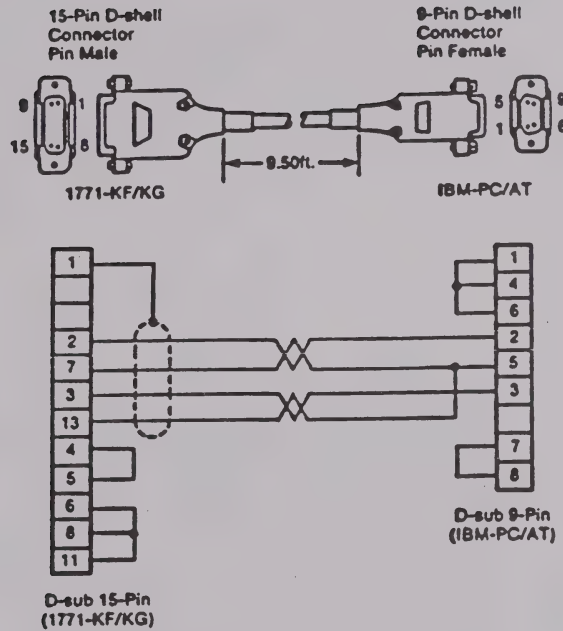


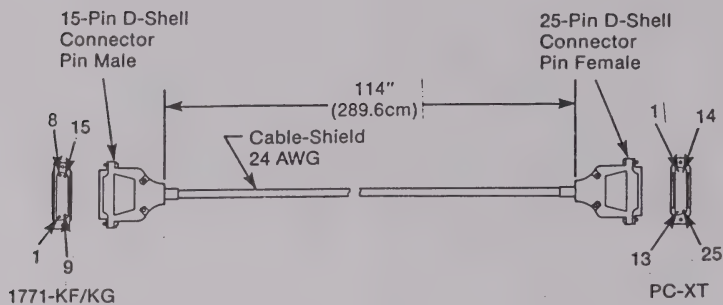
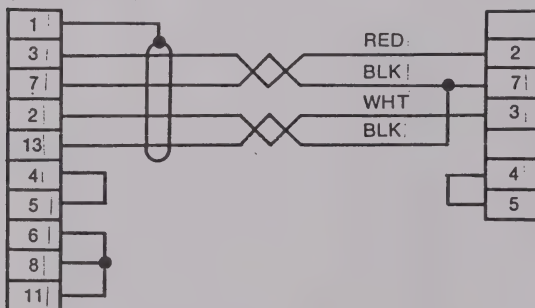
Note: The HP Vector recorder uses the same cable.

Signal	Abbreviation
Shield (Frame Ground)	
Transmitted Data	TXD
Received Data	RXD
Request to Send	RTS
Clear to Send	CTS
Data Set Ready	DSR
Signal Ground	GND
Data Carrier Detect	DCD
Data Terminal Ready	DTR

Cat. No. 1784-CAK

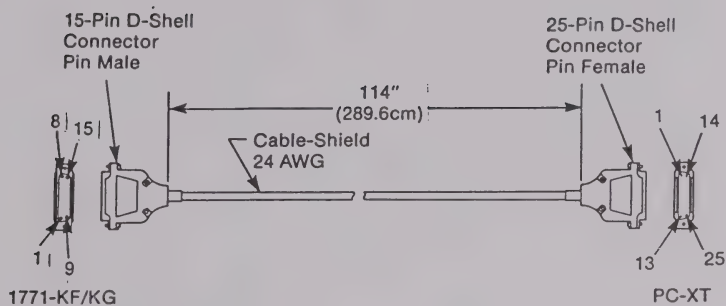
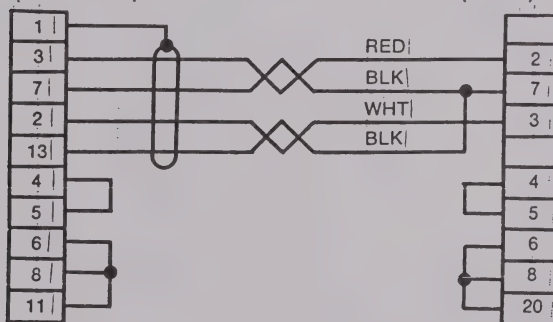
IBM-PC/AT to 1771-KF/KG Interconnect Cable



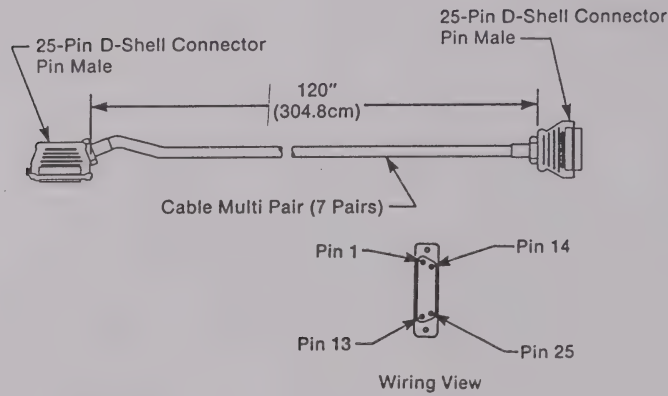
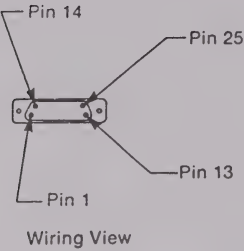
Cat. No. 1784-CYK**6120-COA/COX to 1771-KF/KG Interconnect Cable**D-SUB 15 PIN
(1771-KF/KG)D-SUB 9 SKT
(6120-COD)

Cat. No. 1784-CXK

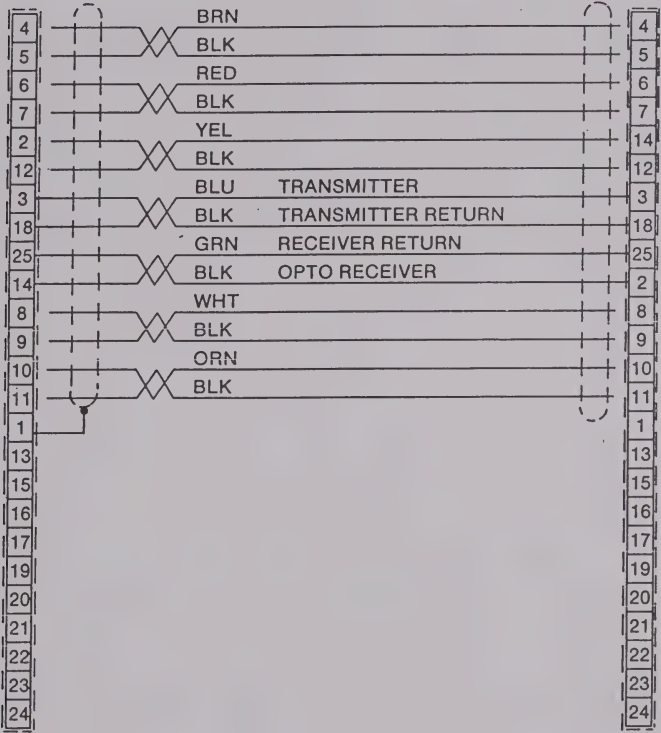
IBM-PC/XT to 1771-KF/KG Interconnect Cable

D-SUB 15 PIN
(1771-KF/KG)D-SUB 25 SKT
(PC-XT)

Cat. No. 1775-CAT
Industrial Terminal Cable



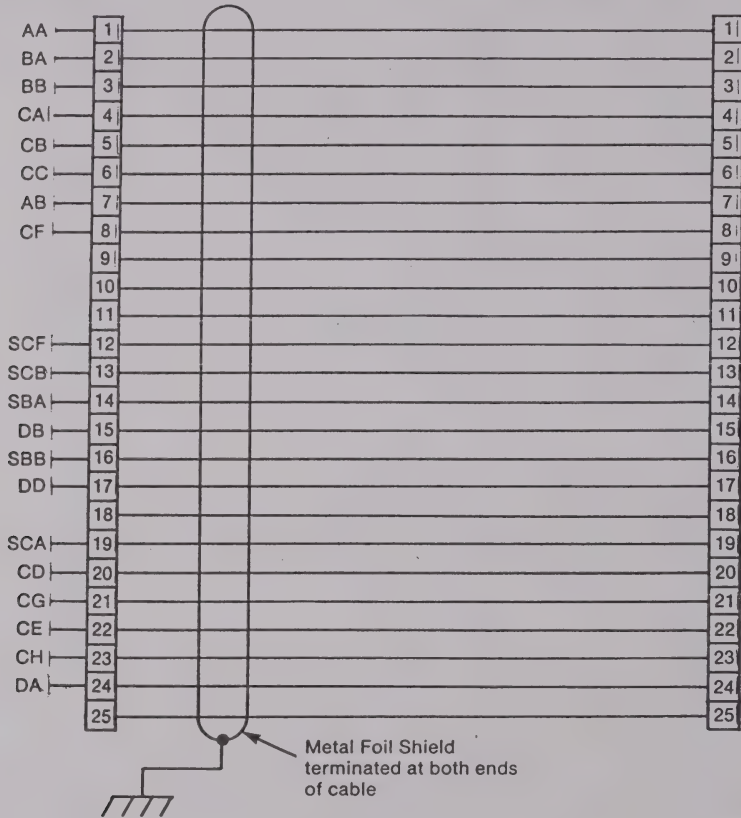
Cat. No. 1775-CAT
Industrial Terminal Cable



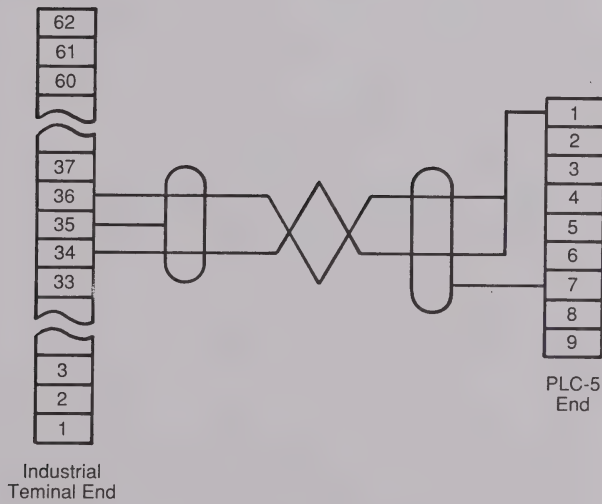
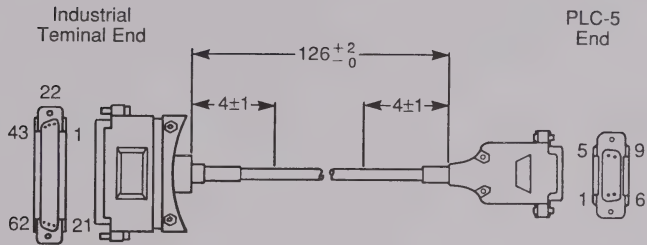
1784-CXS

Data Cartridge Recorder
(cat. no. 1770-SB)
25-pin Male "D" Shell Connector
with Metal Hood

Programming Device
25-pin Female "D" Shell Connector
with Metal Hood



1784-CP



Switch Settings

The following shows one valid way to configure the switch settings for a 1770-KF2 or a 1785-KE communication interface module:

SW-8	SW-1	SW-2	SW-3	SW-4	SW-5	SW-6	SW-7
| 0 1 |	| 0 0 0 0 0 |	| 0 0 |	| 0 0 0 |	| 0 0 0 |	| 1 1 |	| 0 1 1 1 |	| 1 0 |
RS232	Full Duplex BCC None (parity)	-----Address-----			57600 Baud	9600 Baud	DH+

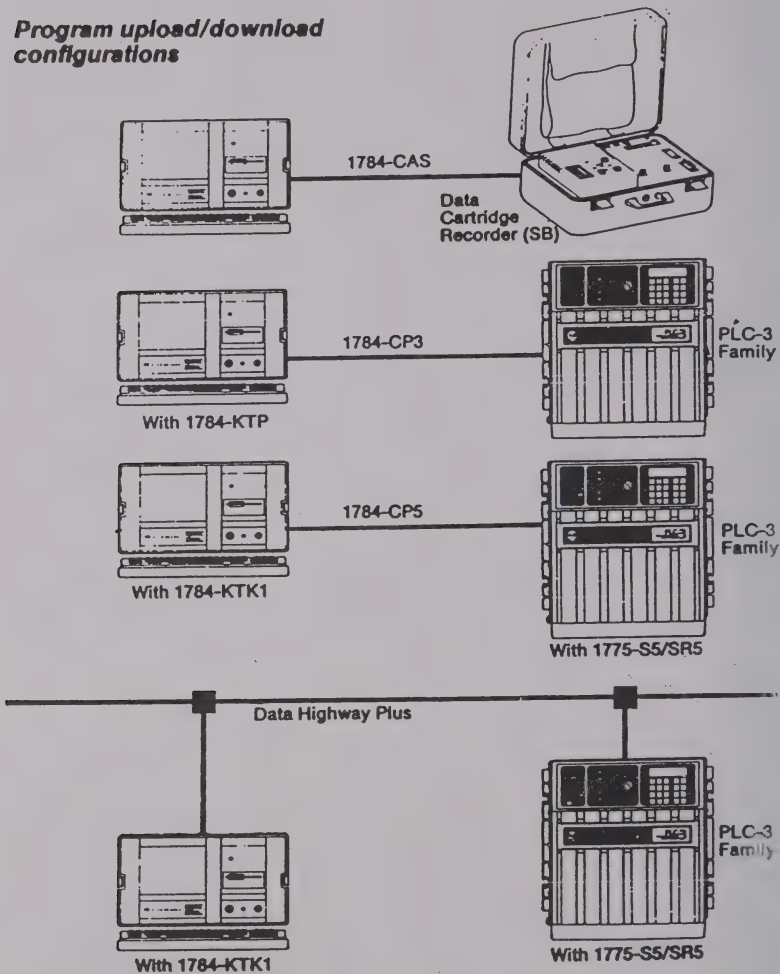
The switches correspond to the following:

Switch:	Function:
SW-1	Asynchronous link features
SW-2, SW-3, SW-4	Station address
SW-5	Data Highway baud rate
SW-6	Asynchronous link baud rate
SW-7	DH/DH+ Selector (1770-KF2 Series B only)
SW-8	RS-232-C or RS-422-A selection

For information about the different possible switch settings, see the "Communication Interface Module User's Manual" for you communication interface module.

The illustration that follows shows you the program upload/download configuration.

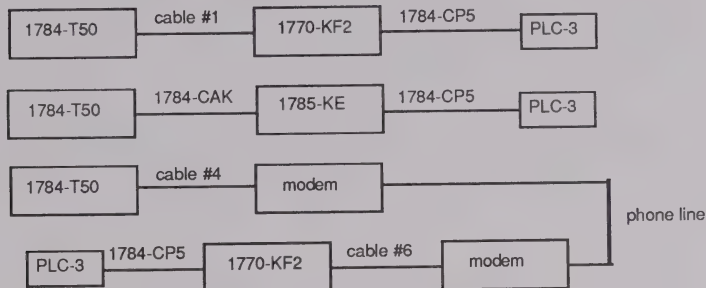
Program upload/download configurations



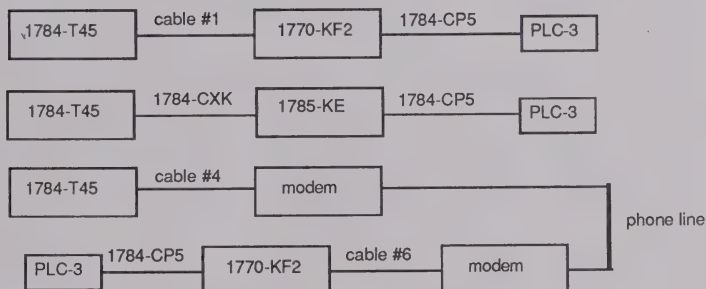
Serial Port Connections

These are cable connections for serial port communications. See pinouts for all cables at the end of this section.

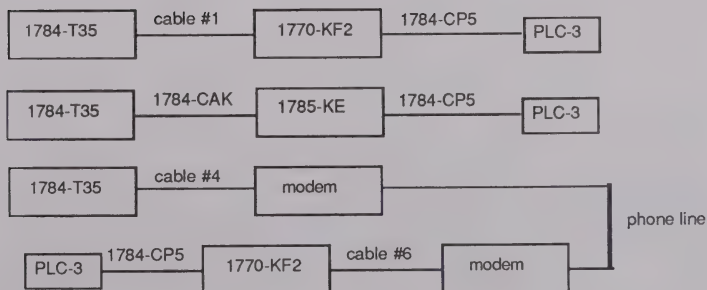
T50



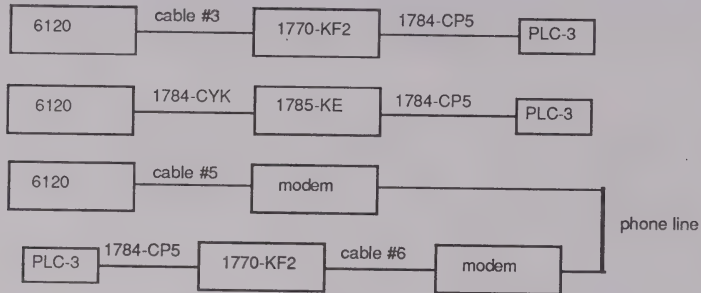
T45



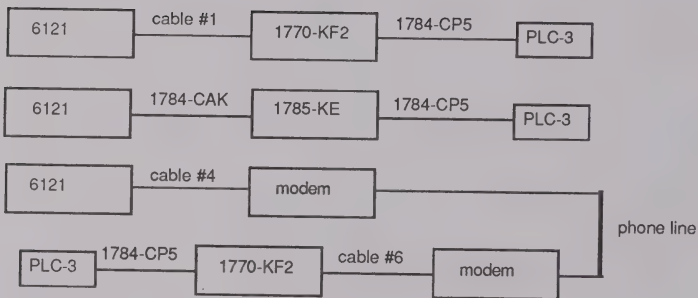
T35



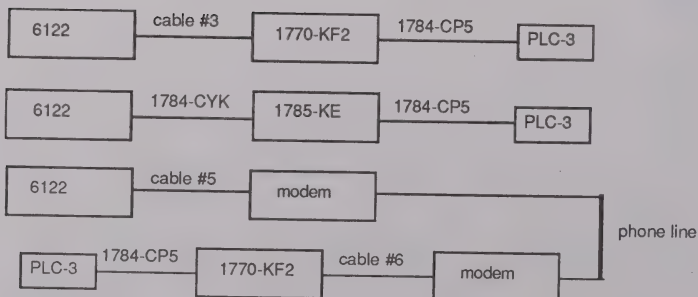
6120



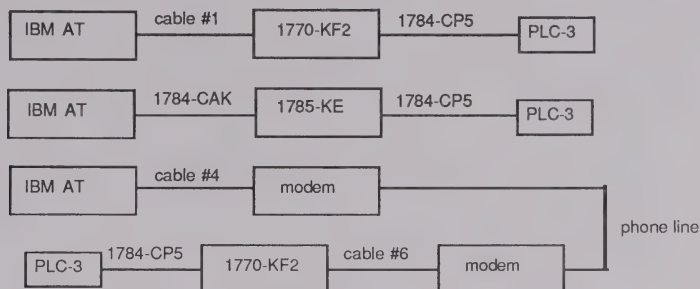
6121



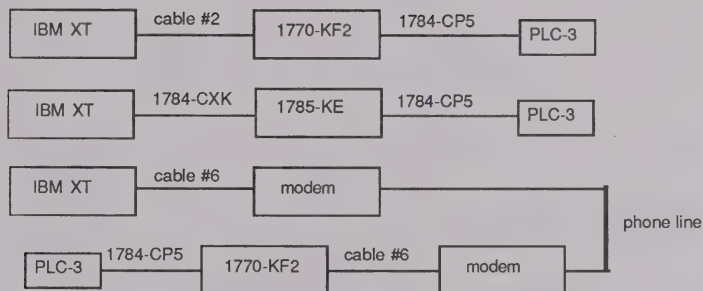
6122



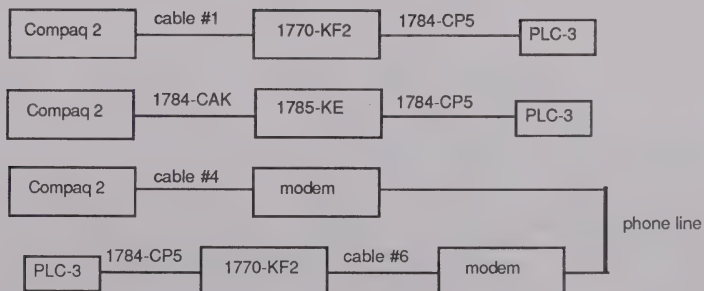
IBM AT

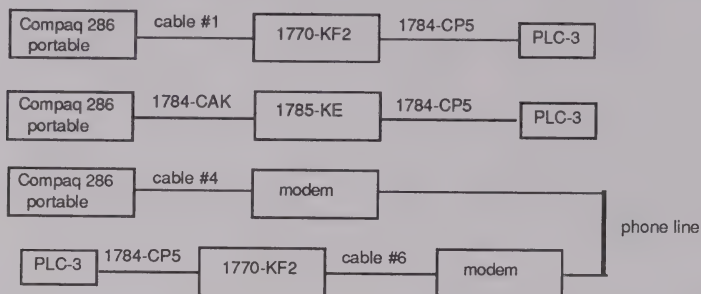
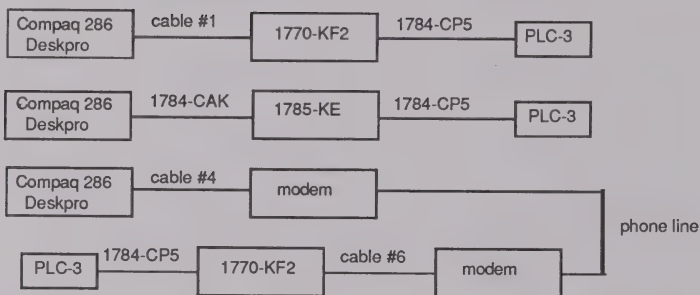
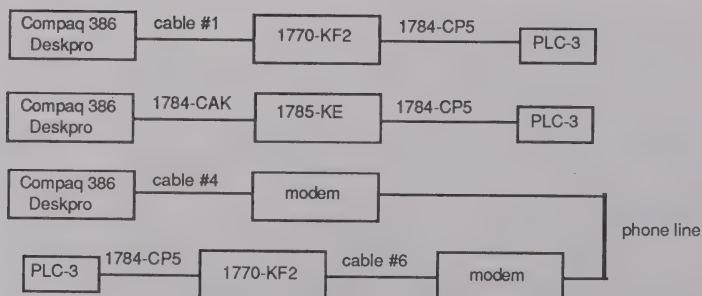


IBM XT



Compaq Portable 2



Compaq Portable 286**Compaq Deskpro 286****Compaq 386**

LIST

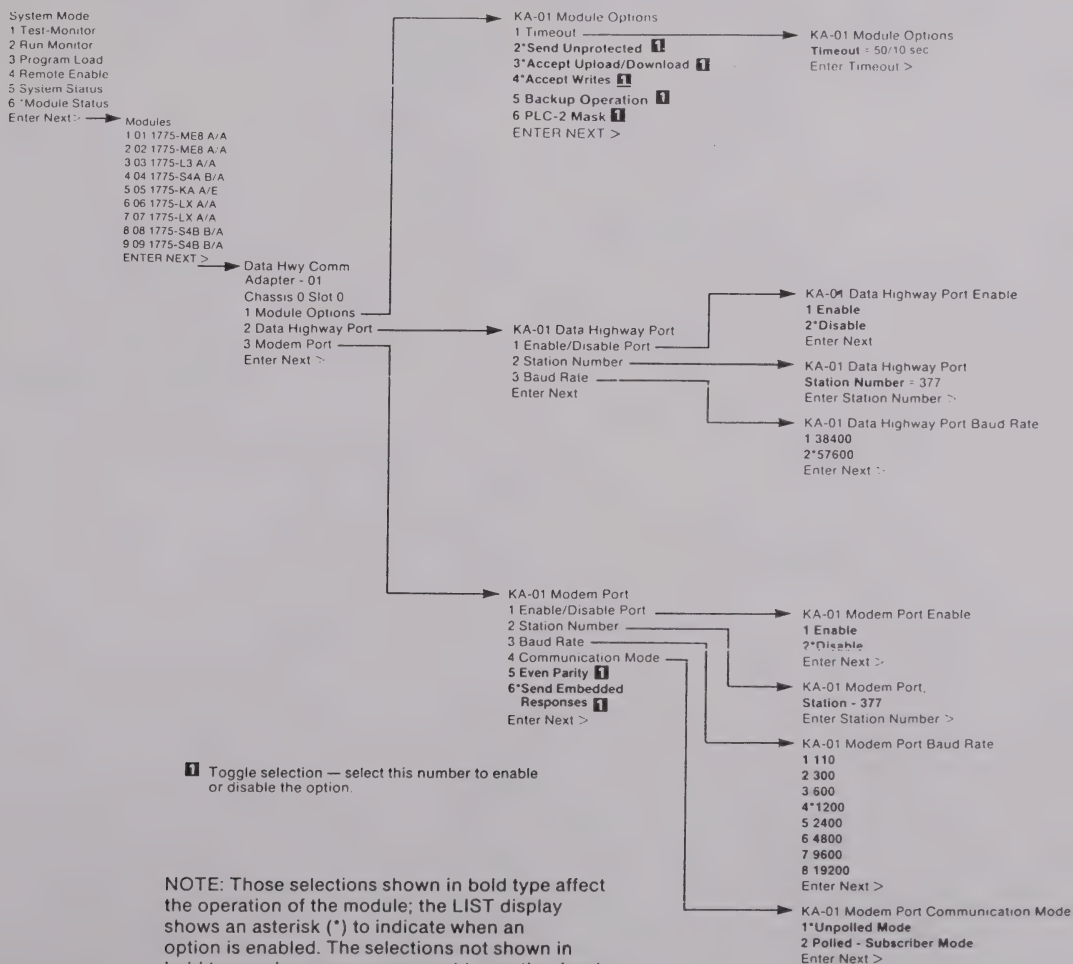
This appendix contains LIST functions for each of these modules:

- 1775-KA
- 1775-GA
- 1775-RM*
- 1775-MX
- 1775-S4A
- 1775-S4B
- 1775-S5

*You need Series A, Rev. F of the 1775-RM module.

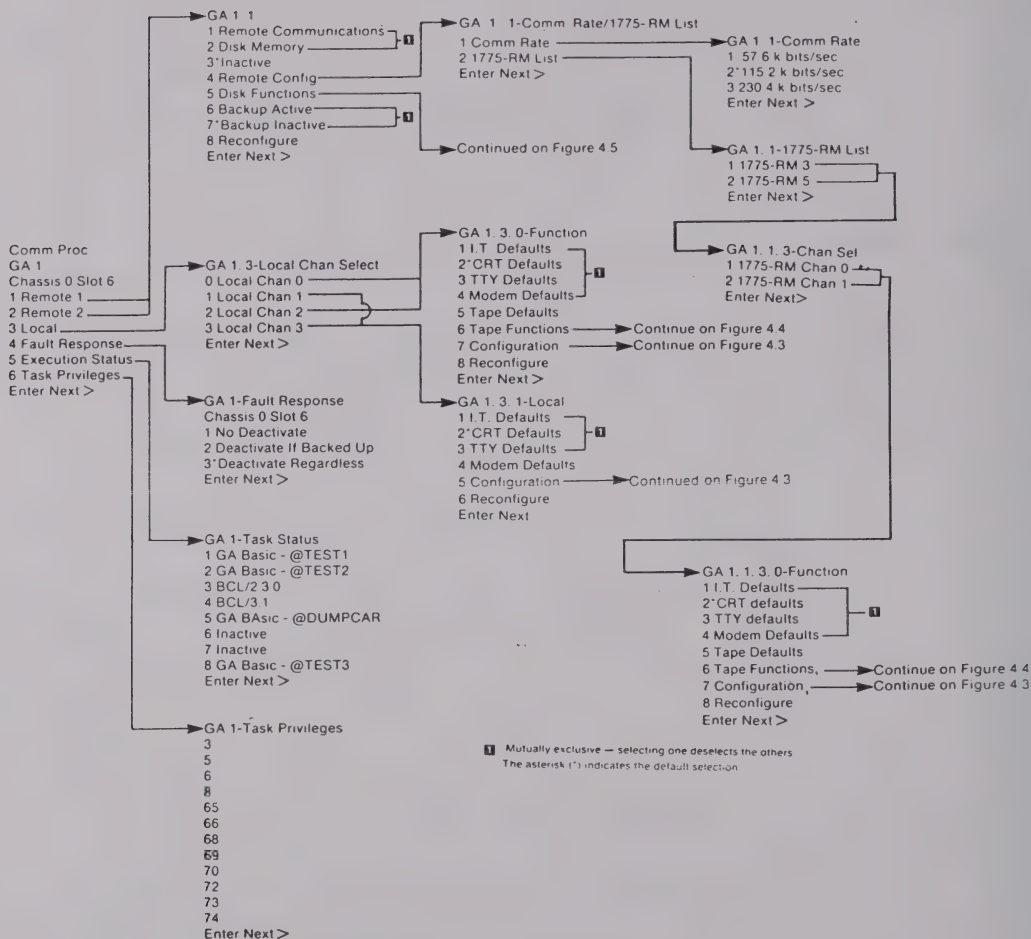
1775-KA Module

Refer to publication 1775-6.5.1 for more detail on the LIST functions for the 1775-KA module.



NOTE: Those selections shown in bold type affect the operation of the module; the LIST display shows an asterisk (*) to indicate when an option is enabled. The selections not shown in bold type only cause a movement to another level of LIST. This selections indicated in this figure are selected by default at the initial power-up

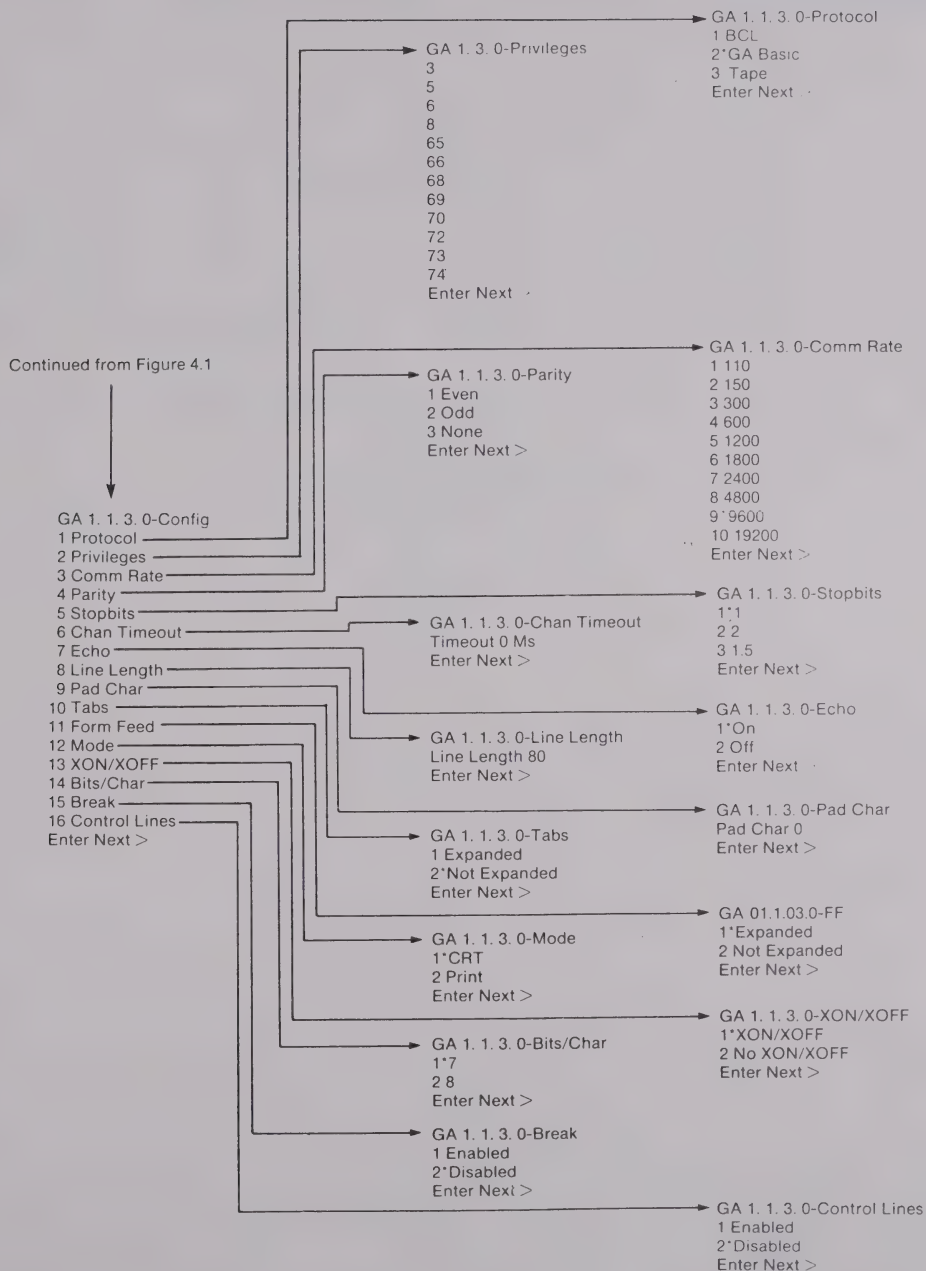
The figures that follow come from publication 1775-6.5.4. They show the general parameter selection LIST guide for the 1775-GA and 1775-RM modules.



(cont'd)

**1775-GA and
1775-RM Modules**

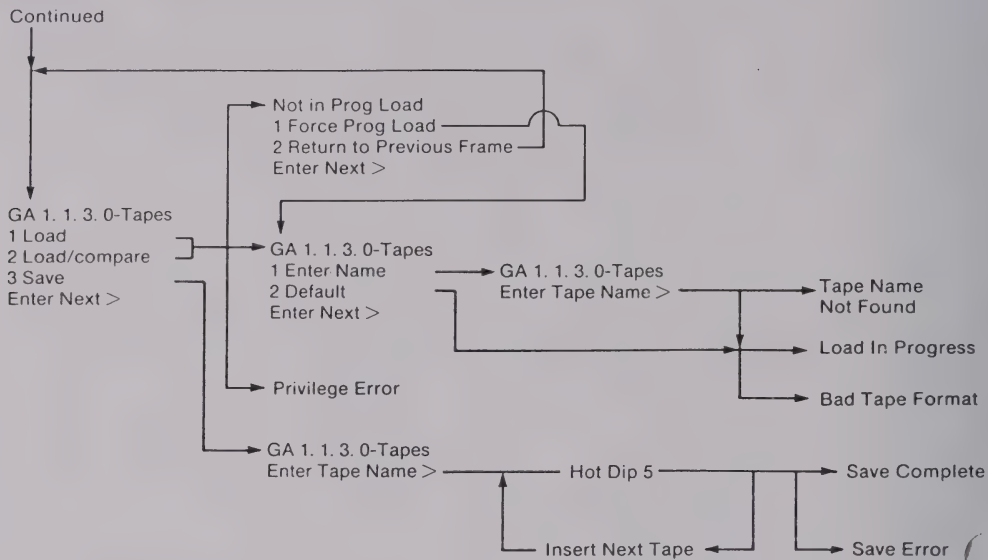
Illustration from publication 1775-6.5.4.



(cont'd)

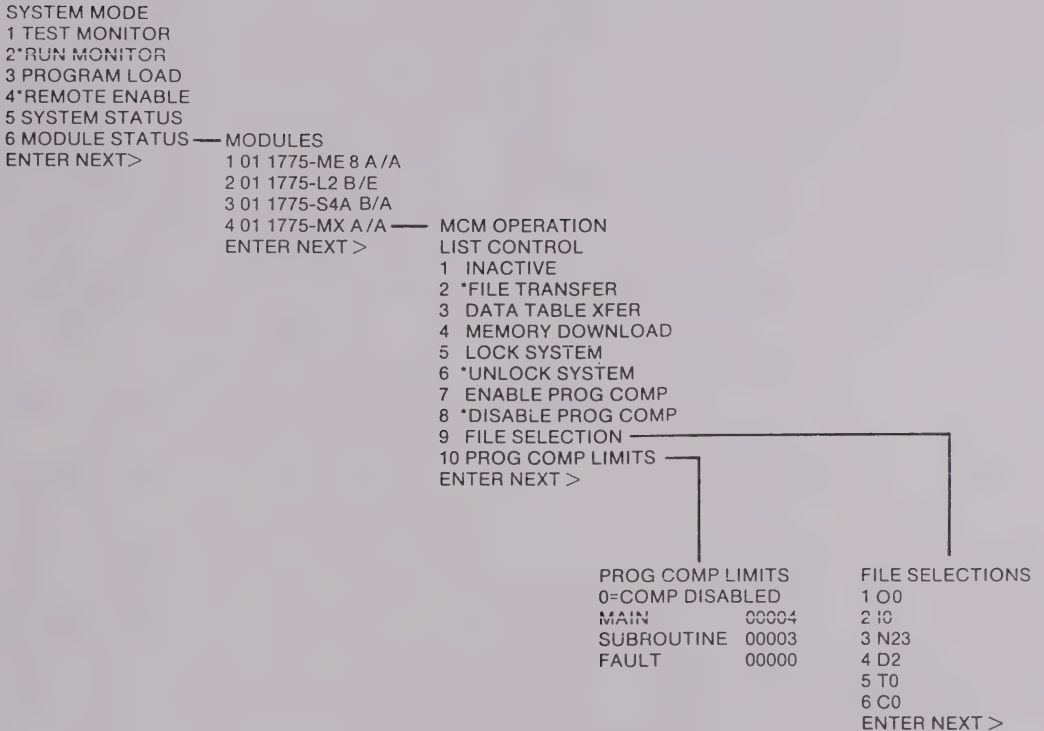
**1775-GA and
1775-RM Modules**

Illustration from publication 1775-6.5.4.



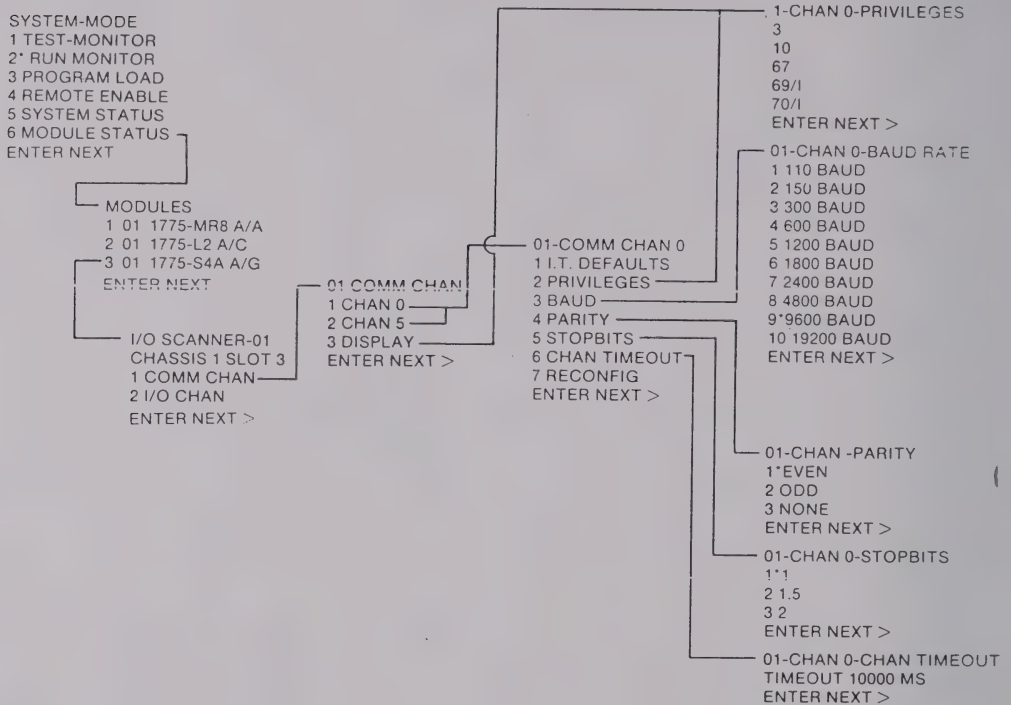
1775-MX Module

The memory communication module LIST functions shown in the figure that follows are in publication 1775-6.3.1.



1775-S4A

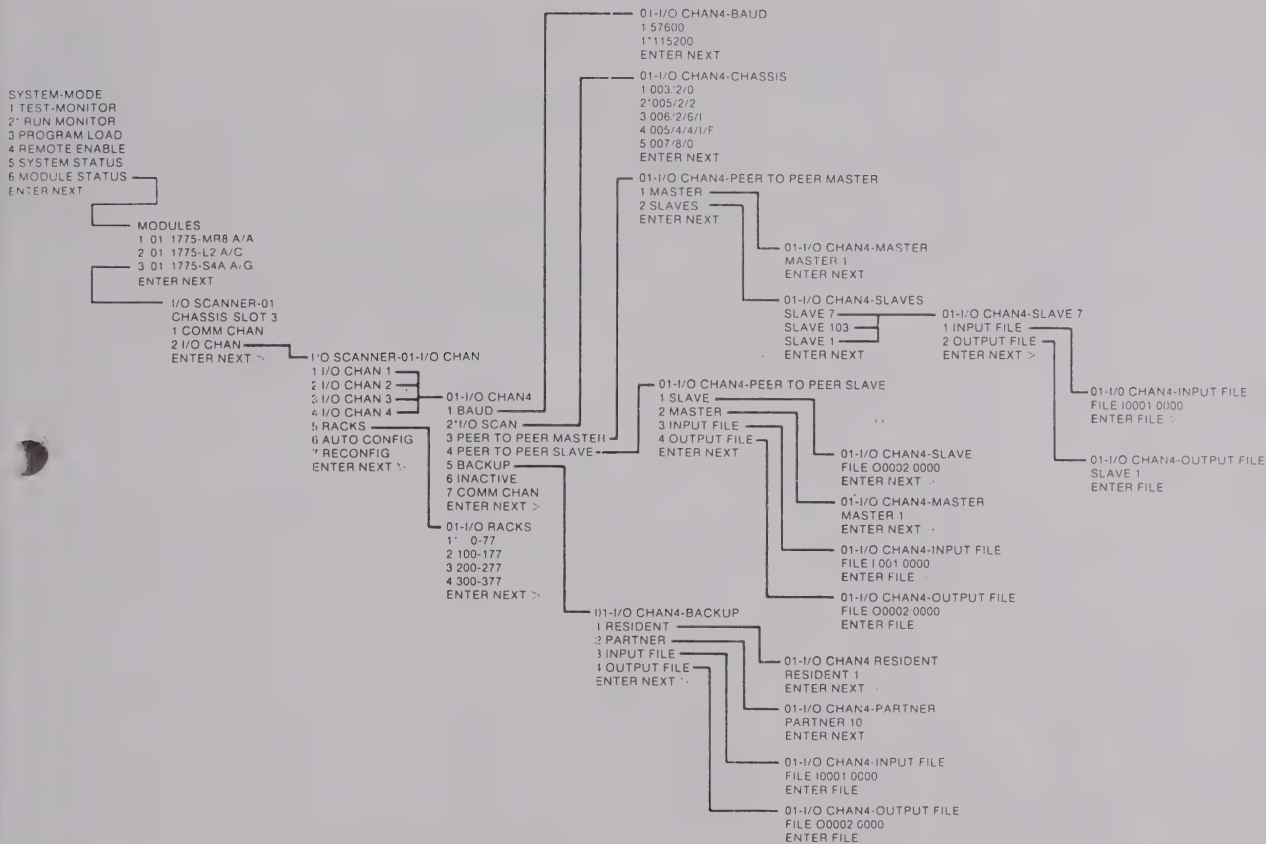
The communication and I/O channel LIST guide for the 1775-S4A follows. For more information, refer to publication 1775-6.5.2



(cont'd)

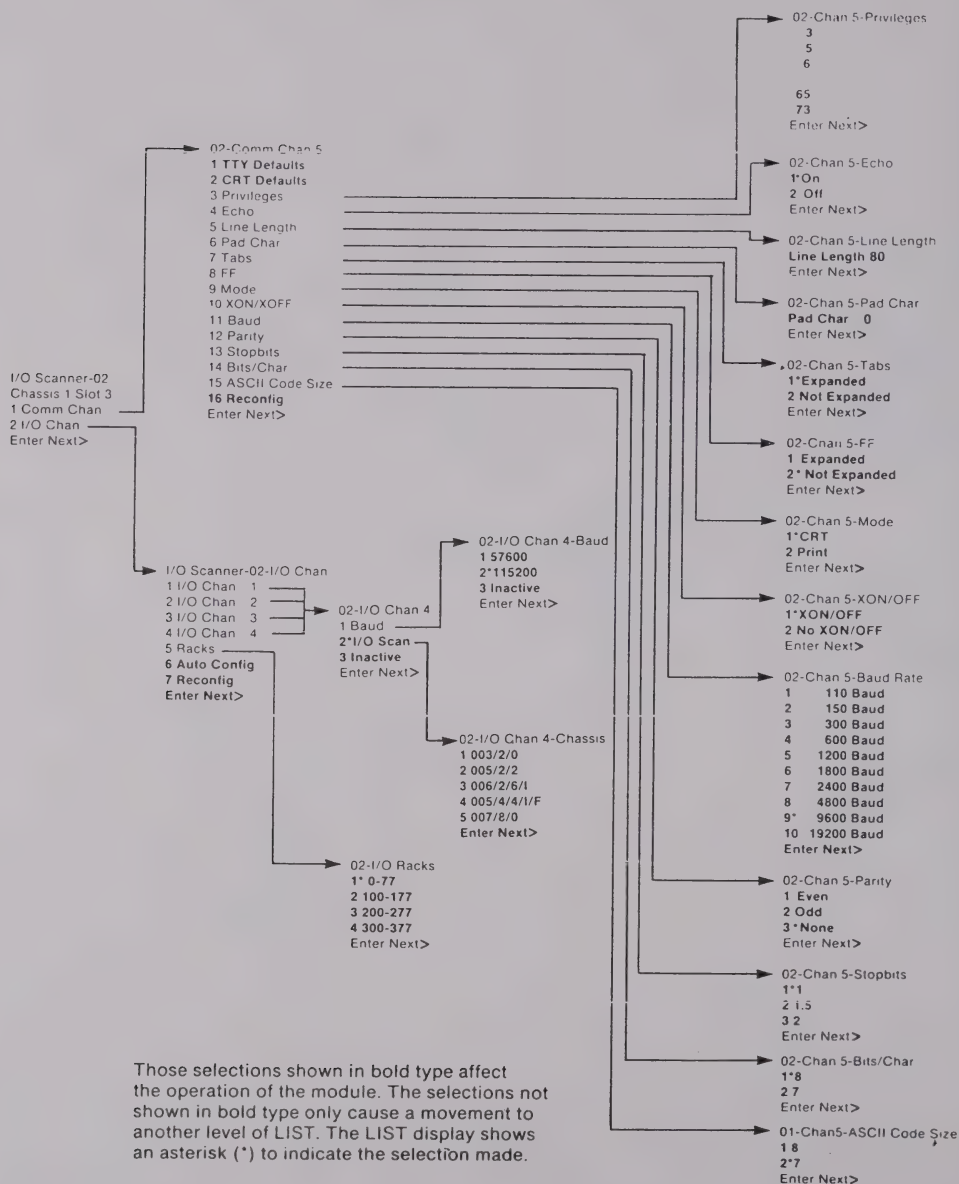
1775-S4A

This figure is from publication 1775-5.5.2.



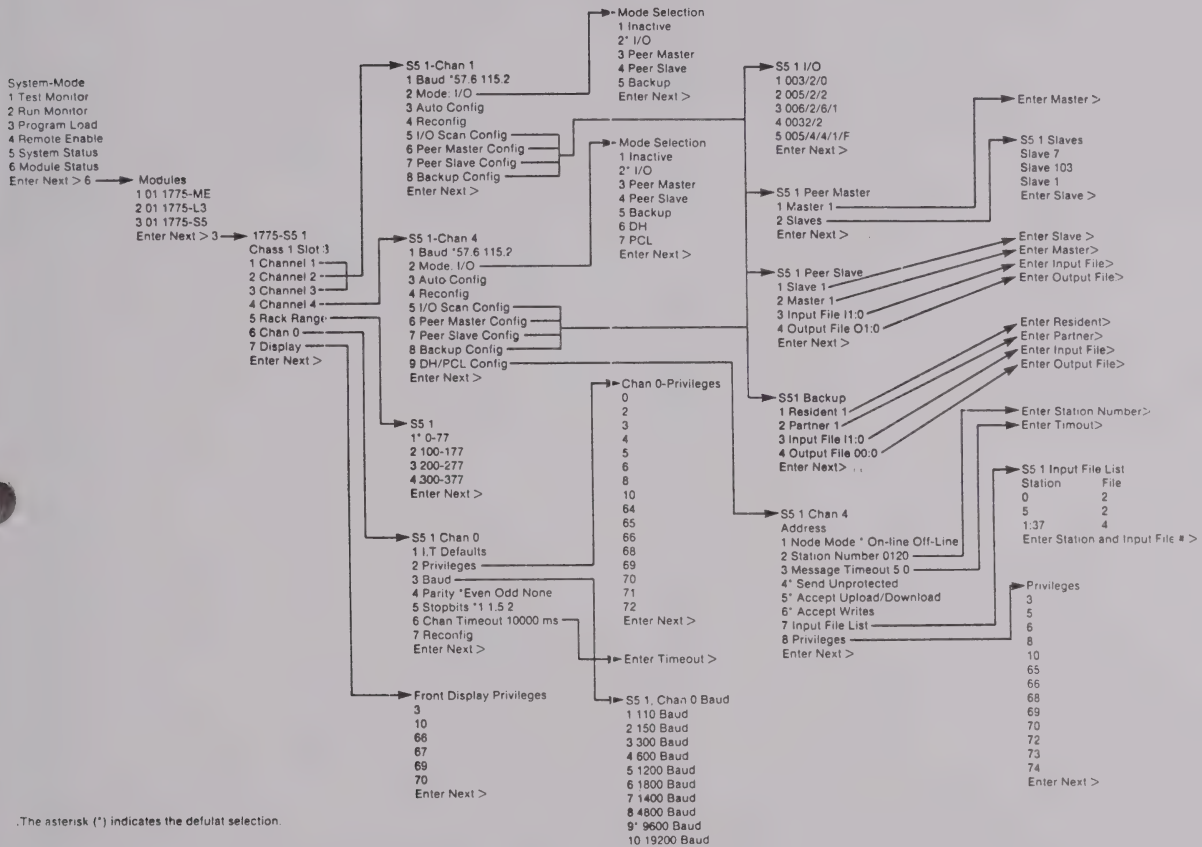
1775-S4B

Here are the LIST selections for the 1775-S4B scanner module. For more information, refer to publication 1775-6.5.3.



1775-S5

LIST selections for the 1775-S5 scanner shown here are discussed in more detail in publication 1775-6.5.5.



The following table defines the main address for each instruction. This information is useful when you work with rung and address comments.

Instruction Mnemonic	Main Address	Instruction Mnemonic	Main Address
ADD	D	MVF	C
ADF	C	MVM	D
AND	D	MVS	D*
ANF	C	NEG	D
BIN	C	NEQ	A
BIR	C	NGF	C
BIS	C	NOT	D
BSL	C	NTF	C
BSR	C	OR	D
BTR	CB	ORF	C
BTW	CB	RES	C/T
CTD	C	RTO	T
CTU	C	SBF	C
DDT	C	SEQ	C
DIV	D	SGE	C
DVF	C	SGR	C
EQU	A	SLE	C
FBC	C	SLS	C
FFL	C	SNE	C
FFU	C	SQF	C
GEQ	A	SQR	D
GRT	A	SUB	D
LEQ	A	TOF	T
LES	A	TON	T
LIM	TEST	TOS	T
MLF	C	XIF	C
MMF	C	XIN	C
MOV	D	XOR	D
MSG	CB	XOF	C
MUL	D		

A = source A

C = control/counter

CB = control block

D = destination

T = timer

The address comment of the "main address" appears next to the instruction.

*If destination is an extended address, a comment cannot be assigned.

File Extensions

The programming software assigns file extensions to disk files based on the type of information the files contain.

File Type:	Uses This Extension:	Stored in:
Save/Restore formats:		\\PDS\ARCH\PLC3
single context logical	.ach	
full or partial logical	.arc	
physical	.phy	
Message		\\PDS\ARCH\PLC3
report generation	.rep	
Data Highway	.hwy	
Rung comment, instruction comment, address comment, and symbol files	.ac\$.b0\$.b1\$	\\PDS\ARCH\PLC3
(Do not change or delete these files)	.ix\$.lx\$.op\$.pc\$	
Cross reference files	.xd\$	\\PDS\ARCH\PLC3
(Do not change or delete these files)	.x0\$.b2\$	
Import/Export files:		\\PDS\TEXT\PLC3
ASCII	.txt	
Log	.log	
Report files:		\\PDS\GIS\PLC3
Data table	.dtr	
Force status	.fsr	
Ladder cross reference	.xrf	
Memory map	.mmr	
Memory usage	.mur	
Processor status	.psr	
Program listing	.lis	
Symbol table	.str	
Unused address	.uar	
I/O status report	.ior	
Data Highway report	.dhr	
Report Generation report	.rgr	
Title file for documentation reports	.ttl	\\PDS\ARCH\PLC3

NOTE: Any files that **end** with a dollar sign (\$) contain the comments, symbols, and cross reference information. **Do not change or delete any of these files** or you will corrupt the database that contains these files (i.e., you will lose the information in these files).

NOTE: Any file extensions that **begin** with a dollar sign (\$) are temporary files that the software creates. Normally the software deletes these files when you leave the software. However, if there is a runtime error (such as turning the programming terminal off before leaving the software), these files remain on the hard disk. You can delete these files.

Sample Reports

This appendix contains samples of these reports:

- . Program Listing
- . Cross Reference
- . Memory Map
- . Processor Status
- . I/O Status
- . Data Table
- . Force Status
- . Symbol Table
- . Unused Addresses
- . Memory Usage
- . Report Generation Procedures
- . Data Highway Procedures Report

This rung will count once per scan.

C2	COUNTER -CTU - M:0
C2/EN	COUNTER - (L) - M:0

Counter 3	
+CTU-	+COUNT UP-
!Counter	C3:
!Preset	1000+-(DN)
!Accum	0:
Totalizer	
Pulse	
Counter	
C3	+CTU-
DN	+COUNT UP-
!Counter	C4:
!Preset	1000+-(DN)
!Accum	0:

IO:112/14 MANPURCOMP
-] [- M:1 M:4

Allen-Bradley Co.
6200 Series Software
PLC-3 Programming Terminal Software
Release 1.5
Program Listing
Station4 Program

: 14 March 1988 - 13:52

Station4 Program
Ladder Listing

14 March 1988 Page 2
Rung M:1

C3 COUNTER3
-CTU- M:1

C3/DN C3DONE
-J [- M:1

C4 TOTPULCNT
-CTU- M:1

NO:0/4 ANAL_ON
-J [- M:1

BI:0/11 DOWNL_COMP
-J [- M:1
-J/[- M:7
- () - M:4

Rung M:2

In the rung comment editor,
control A is used to toggle between
insert mode and overstrike mode.
! Palletizer!Conveyor !Good part
! Not Full !Running !Sensor

! IO:16 IO:3 IO:114
+----] [-----] [-----] [-----] 11
! ON 05 OFF02

IO:3/02 CONVEY_RUN
-J [- M:2 M:3

IO:16/05 PALLET_NE
-J [- M:2

IO:114/11 GOODPART
-J [- M:2 M:10

C5 NUM_GOOD
-CTD- M:3
-CTU- M:2

Quality
part
Counter
+CTU-
+COUNT UP
!Counter CS!
!Preset 900+-(DN)
!Accum 0!
+-----+
+-(CU)+

Rung comments can be 6 lines of 80 characters.

```
! Rapid
!Converyor !Bad part
```

[illegible]

Rung M:6
Controls located on Panel W in Central Control Room.

[illegible]

I0:12/12	NCUT_RUN -J [- M:6 M:11
C17	COUNTER17 -MOV- M:6
#N0:0	EXTR_TEMP -MOV- M:6
N0:1	INIT_TEMP -MOV- M:6
N0:2	EXTROUTEMP -MOV- M:6
#N2:1	PROD_B_SET -MOV- M:6 M:7
N2:1	DRYBELTEN -LIM- M:6 -MOV- M:7
N2:3	PRESS_PROF -LIM- M:6 -MOV- M:7
N2:4	SYS1_FLOW -LIM- M:6
F4:7	VEL_FDBK -LES- M:12 -MOV- M:6
F4:7/15	VELFDBST -J [- M:6

```
B1:0/7
MEANSQ_COM
-] L-M:6
-( )-M:4
```

Reset	Nozzle	Autoclave
Recipe	Fill	Dye Recipe
Variances	Solenoid	Download
	On	Complete

```

D0:112/12
NOZ_FILL
-]/[- M:7
-(-)- M:5

SEL_N_CUT
-]/[- M:7

COUNTER18
-MVF- M:7

EXTR_INTEM
-MVF- M:7

PRGD_E_SET
-MVF- M:6 M:7

```


D3:3/3 DRUMFILFAS
-(L)- M:8
-(U)- M:9

Rung M:9
: Send Raw Bar Code
: Material Check
: To Lower
: Weigh Scal
: Feeder

: D1:1 A1:15
: J/L-]

11 6

+

+ADD-

+ADD A + B

: Source A

: Source B

: Destin

: D1:1

: D2:2

: D3:3

: D1:1

: D2:2

: D3:3

: D1:1

: D2:2

: D3:3

: D1:1

: D2:2

: D3:3

: D1:1

: D2:2

: D3:3

: D1:1

: D2:2

: D3:3

: D1:1

: D2:2

: D3:3

: D1:1

: D2:2

: D3:3

: D1:1

: D2:2

: D3:3

: D1:1

: D2:2

: D3:3

: D1:1

: D2:2

: D3:3

: D1:1

: D2:2

: D3:3

: D1:1

: D2:2

: D3:3

: D1:1

: D2:2

: D3:3

: D1:1

: D2:2

: D3:3

: D1:1

: D2:2

: D3:3

: D1:1

: D2:2

: D3:3

: D1:1

: D2:2

: D3:3

: D1:1

: D2:2

: D3:3

: D1:1

: D2:2

: D3:3

: D1:1

: D2:2

: D3:3

Drum
Vacuum
Filter
Speed
Control

Control
Counter 10

Test
Calc

+MOVE WITH FILES + (EN) +
:Source #D1:1
:Destin #D2:2+- (DN)
:Counter C10:
:Mode ALL+- (ER)
:Length 334:
:Position 334:
+
Control
Counter 21

Send Raw
Material
To Lower
Weigh Scal
Feeder

+ADF +FILE ADD + (EN) +
:Source A #D3:3
:Source B #D2:2+- (DN)
:Destin #D1:1
:Counter C21+- (ER)
:Mode ALL:
:Length 332:
:Position 332:
+
Control
Counter 21

+ADF +FILE ADD + (EN) +
:Source A #D3:3
:Source B #D2:2+- (DN)
:Destin #D1:1
:Counter C21+- (ER)
:Mode ALL:
:Length 332:
:Position 332:
+
Control
Counter 21

+ADF +FILE ADD + (EN) +
:Source A #D3:3
:Source B #D2:2+- (DN)
:Destin #D1:1
:Counter C21+- (ER)
:Mode ALL:
:Length 332:
:Position 332:
+
Control
Counter 21

+ADF +FILE ADD + (EN) +
:Source A #D3:3
:Source B #D2:2+- (DN)
:Destin #D1:1
:Counter C21+- (ER)
:Mode ALL:
:Length 332:
:Position 332:
+
Control
Counter 21

+ADF +FILE ADD + (EN) +
:Source A #D3:3
:Source B #D2:2+- (DN)
:Destin #D1:1
:Counter C21+- (ER)
:Mode ALL:
:Length 332:
:Position 332:
+
Control
Counter 21

+ADF +FILE ADD + (EN) +
:Source A #D3:3
:Source B #D2:2+- (DN)
:Destin #D1:1
:Counter C21+- (ER)
:Mode ALL:
:Length 332:
:Position 332:
+
Control
Counter 21

+ADF +FILE ADD + (EN) +
:Source A #D3:3
:Source B #D2:2+- (DN)
:Destin #D1:1
:Counter C21+- (ER)
:Mode ALL:
:Length 332:
:Position 332:
+
Control
Counter 21

+ADF +FILE ADD + (EN) +
:Source A #D3:3
:Source B #D2:2+- (DN)
:Destin #D1:1
:Counter C21+- (ER)
:Mode ALL:
:Length 332:
:Position 332:
+
Control
Counter 21

+ADF +FILE ADD + (EN) +
:Source A #D3:3
:Source B #D2:2+- (DN)
:Destin #D1:1
:Counter C21+- (ER)
:Mode ALL:
:Length 332:
:Position 332:
+
Control
Counter 21

+ADF +FILE ADD + (EN) +
:Source A #D3:3
:Source B #D2:2+- (DN)
:Destin #D1:1
:Counter C21+- (ER)
:Mode ALL:
:Length 332:
:Position 332:
+
Control
Counter 21

+ADF +FILE ADD + (EN) +
:Source A #D3:3
:Source B #D2:2+- (DN)
:Destin #D1:1
:Counter C21+- (ER)
:Mode ALL:
:Length 332:
:Position 332:
+
Control
Counter 21

+ADF +FILE ADD + (EN) +
:Source A #D3:3
:Source B #D2:2+- (DN)
:Destin #D1:1
:Counter C21+- (ER)
:Mode ALL:
:Length 332:
:Position 332:
+
Control
Counter 21

+ADF +FILE ADD + (EN) +
:Source A #D3:3
:Source B #D2:2+- (DN)
:Destin #D1:1
:Counter C21+- (ER)
:Mode ALL:
:Length 332:
:Position 332:
+
Control
Counter 21

C10 COUNTER10
-MVF- M:9

C21 COUNTER21
-ADF- M:9

#D1:1 WT_PRECO
-ADF- M:9
-MVF- M:9

D1:1 MAT_WT
-ADD- M:9
-ADF- M:8
-MOV- M:8

D1:1/11 LOWER_FDR
-J C- M:8
-J/L- M:9
-()- M:9

Station4 Program
Ladder Listing

```
#D2:2
WT_BIAS
-ADF-- M:9
-MVF-- M:9

D2:2
FILELENGTH
-ADD-- M:9
-DIV-- S:1
-MOV-- M:9 S:0
```

```
D2:2/2
TEST_CALC
-J/[--M:8
--( )--M:9
```

```
#D3:3
REGU_WTS
-ADE-- M:9
```

```

D3:3      DRUMFIL_SP
          -ADD-- M:9
          -ADF-- M:8

```

D3:3/3
DRUMFILFAS
-(L) - M:8
-(U) - M:9

A1:15/6
BAR_CODE
-] [- M:3

```

Rung M:10
  ! Dwell
  ! Timer
Counter8
Enable

```

```

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100
101
102
103
104
105
106
107
108
109
110
111
112
113
114
115
116
117
118
119
120
121
122
123
124
125
126
127
128
129
130
131
132
133
134
135
136
137
138
139
140
141
142
143
144
145
146
147
148
149
150
151
152
153
154
155
156
157
158
159
160
161
162
163
164
165
166
167
168
169
170
171
172
173
174
175
176
177
178
179
180
181
182
183
184
185
186
187
188
189
190
191
192
193
194
195
196
197
198
199
200
201
202
203
204
205
206
207
208
209
210
211
212
213
214
215
216
217
218
219
220
221
222
223
224
225
226
227
228
229
230
231
232
233
234
235
236
237
238
239
240
241
242
243
244
245
246
247
248
249
250
251
252
253
254
255
256
257
258
259
260
261
262
263
264
265
266
267
268
269
270
271
272
273
274
275
276
277
278
279
280
281
282
283
284
285
286
287
288
289
290
291
292
293
294
295
296
297
298
299
300
301
302
303
304
305
306
307
308
309
310
311
312
313
314
315
316
317
318
319
320
321
322
323
324
325
326
327
328
329
330
331
332
333
334
335
336
337
338
339
340
341
342
343
344
345
346
347
348
349
350
351
352
353
354
355
356
357
358
359
360
361
362
363
364
365
366
367
368
369
370
371
372
373
374
375
376
377
378
379
380
381
382
383
384
385
386
387
388
389
390
391
392
393
394
395
396
397
398
399
400
401
402
403
404
405
406
407
408
409
410
411
412
413
414
415
416
417
418
419
420
421
422
423
424
425
426
427
428
429
430
431
432
433
434
435
436
437
438
439
440
441
442
443
444
445
446
447
448
449
450
451
452
453
454
455
456
457
458
459
460
461
462
463
464
465
466
467
468
469
470
471
472
473
474
475
476
477
478
479
480
481
482
483
484
485
486
487
488
489
490
491
492
493
494
495
496
497
498
499
500
501
502
503
504
505
506
507
508
509
510
511
512
513
514
515
516
517
518
519
520
521
522
523
524
525
526
527
528
529
530
531
532
533
534
535
536
537
538
539
540
541
542
543
544
545
546
547
548
549
550
551
552
553
554
555
556
557
558
559
560
561
562
563
564
565
566
567
568
569
570
571
572
573
574
575
576
577
578
579
580
581
582
583
584
585
586
587
588
589
590
591
592
593
594
595
596
597
598
599
600
601
602
603
604
605
606
607
608
609
610
611
612
613
614
615
616
617
618
619
620
621
622
623
624
625
626
627
628
629
630
631
632
633
634
635
636
637
638
639
640
641
642
643
644
645
646
647
648
649
650
651
652
653
654
655
656
657
658
659
660
661
662
663
664
665
666
667
668
669
670
671
672
673
674
675
676
677
678
679
680
681
682
683
684
685
686
687
688
689
690
691
692
693
694
695
696
697
698
699
700
701
702
703
704
705
706
707
708
709
710
711
712
713
714
715
716
717
718
719
720
721
722
723
724
725
726
727
728
729
730
731
732
733
734
735
736
737
738
739
740
741
742
743
744
745
746
747
748
749
750
751
752
753
754
755
756
757
758
759
760
761
762
763
764
765
766
767
768
769
770
771
772
773
774
775
776
777
778
779
780
781
782
783
784
785
786
787
788
789
790
791
792
793
794
795
796
797
798
799
800
801
802
803
804
805
806
807
808
809
810
811
812
813
814
815
816
817
818
819
820
821
822
823
824
825
826
827
828
829
830
831
832
833
834
835
836
837
838
839
840
841
842
843
844
845
846
847
848
849
850
851
852
853
854
855
856
857
858
859
860
861
862
863
864
865
866
867
868
869
870
871
872
873
874
875
876
877
878
879
880
881
882
883
884
885
886
887
888
889
890
891
892
893
894
895
896
897
898
899
900
901
902
903
904
905
906
907
908
909
910
911
912
913
914
915
916
917
918
919
920
921
922
923
924
925
926
927
928
929
930
931
932
933
934
935
936
937
938
939
940
941
942
943
944
945
946
947
948
949
950
951
952
953
954
955
956
957
958
959
960
961
962
963
964
965
966
967
968
969
970
971
972
973
974
975
976
977
978
979
980
981
982
983
984
985
986
987
988
989
990
991
992
993
994
995
996
997
998
999
1000
1001
1002
1003
1004
1005
1006
1007
1008
1009
1010
1011
1012
1013
1014
1015
1016
1017
1018
1019
1020
1021
1022
1023
1024
1025
1026
1027
1028
1029
1030
1031
1032
1033
1034
1035
1036
1037
1038
1039
1040

```

1	17
---	----

1	Hopper
2	LoLo
3	Level

10:64
+-----] / [-----
05

00:11E/17
HHH_ALM
-J/L- M:10
--()- M:5

Temporary
Storage
Point

00:135

Set
Cooling

Air Stop
Closed
Limit
Switch

10:01

15

Product B	Upper Limit	Temperature
1	10	10
2	10	10
3	10	10
4	10	10
5	10	10
6	10	10
7	10	10
8	10	10
9	10	10
10	10	10
11	10	10
12	10	10
13	10	10
14	10	10
15	10	10
16	10	10
17	10	10
18	10	10
19	10	10
20	10	10
21	10	10
22	10	10
23	10	10
24	10	10
25	10	10
26	10	10
27	10	10
28	10	10
29	10	10
30	10	10
31	10	10
32	10	10
33	10	10
34	10	10
35	10	10
36	10	10
37	10	10
38	10	10
39	10	10
40	10	10
41	10	10
42	10	10
43	10	10
44	10	10
45	10	10
46	10	10
47	10	10
48	10	10
49	10	10
50	10	10
51	10	10
52	10	10
53	10	10
54	10	10
55	10	10
56	10	10
57	10	10
58	10	10
59	10	10
60	10	10
61	10	10
62	10	10
63	10	10
64	10	10
65	10	10
66	10	10
67	10	10
68	10	10
69	10	10
70	10	10
71	10	10
72	10	10
73	10	10
74	10	10
75	10	10
76	10	10
77	10	10
78	10	10
79	10	10
80	10	10
81	10	10
82	10	10
83	10	10
84	10	10
85	10	10
86	10	10
87	10	10
88	10	10
89	10	10
90	10	10
91	10	10
92	10	10
93	10	10
94	10	10
95	10	10
96	10	10
97	10	10
98	10	10
99	10	10
100	10	10

4
-----] [-----
O:ON#
FeT4

00:135/12	TEMPSTORE	
	-J [- M:11	
	-J/[- M:9	
	-() - M:11	
	-(L) - M:10	
10:126/15	AIRSTOP_LS	
	-J [- M:11 M:4 M:10	
10:131/07	BLOWDIFSW	
	-J [- M:10 M:11	
10:131/10	TOTALMACK	
	-J [- M:10	
	-J/[- M:11 M:12	
10:144/05	HOP_LOLEV	
	-J [- M:11 M:11 M:12	
	-J/[- M:10	
10:114/11	GOODPART	
	-J [- M:12 M:10	
10:134/03	EVAPBEAKPSW	
	-J/[- M:10	
TPRE:23/1	DWELL_LOLO	
	-J [- M:10	
C8/17	COUNTERBEN	
	-J [- M:10	
CACC:8/4	PASS1DN	
	-J [- M:10	
#NO:0/4	TEMP_FLAG	
	-J [- M:10	
#N2:4/B	FLOW_RATE	
	-() - M:10	
H1:4/2	PROCCALC	
	-J [- M:7	
	-J/[- M:10	
	-() - M:11	

Station4 Program
Ladder Listing

F4:7 VEL_FDBK
-LES- M:12
-MOV- M:6

B0:29/15 RECIPE_VAR
-J [- M:12
-J/[- M:7
-()- M:4

B1:0/12 BACKUPCOMP
--()- M:4 M:12

Rung M:13
:
+
:

-----END OF PROGRAM-----

Procedure to calculate the arithmetic average of data values in a file.
Before running, store file length in D2:2.
psec:1,pfil:1, and pword:1 indicate the section, file and starting word of the data that will be averaged. Use data monitor to set up psec, pfil, pword.
Move sets the timer preset to the file length.

```

!! File
!! Averaging
!! Procedure
!! Enable
!! Calculation

```

Label 1

IO:35/10

12

TPRE:2

999

```
FILELENGTH
--ADD-- M:9
--DIV-- S:1
--MOV-- M:8
```


Station4 Program
Ladder Listing

```
Rung 5:2
When answer is valid, move answer to D2:4
```

```

: Rung
: Enabled
: When
: Timer2 is
: Timing
: T2
: +-----] / [-----
:

```

+MOV-	+
+MOVE	+
|Source	D2:3
|	0
|Destin	D2:4
|	0
+	+

```
T2/TT
TIMER2TT
-] [- S:1
-]/ [- S:2
```

```
D2:3
TEMPRESULT
--DIV-- S:1
--MOV-- S:2
```

```
D2:4
FINALRESUL
-ADF- M:8
-MOV- S:2
```

Run 5:3

(RET) - +

Run 5:4

END OF PROGRAM-

+

REPORT OPTIONS SUMMARY

Page Width:	132
Page Length:	66
Graphics Capabilities:	NO
Context:	1
Right Power Rail:	YES
Address Comments:	YES
Symbols:	NO
Rung Comments:	YES
Cross References:	ALL
Starting Rung:	M:0
Ending Rung:	F:32767

```

Rung M:1
| | Manifold      Hopper
| | Purging      !LoLo
| | Cycle        !Limit
| | Complete     Switch
| | MANPURCOMP  HOP_LOLEV  AIRSTOP_LS
| | 10:112      10:64      10:26
| +-----+-----+-----+
| | ON 14      05      15
| |
| |
| |
| |
| | Tank Empty:Analog
| | Indicator:Card
| | Light        Power On
| |
| | EMPTY_LITE  ANAL_ON
| | DO:111      NO:0
| |
| +-----+-----+-----+
| | 11          4      11

```

[illegible]

C3	COUNTER3 -CTU- M:1
C4	TOTPULCNT -CTU- M:1

Allen-Bradley Co.
6200 Series Software
PLC-3 Programming Terminal Software
Release 1.5
Program Listing

Station4 Program

14 March 1988 - 14:15


```

+++
|
| Counter6 !Counter5 !Blowback
| Done !Done !Timer
| ! ! Done
| ! ! COUNTER6DN COUNTER5DN BLOWBACKDN
| ! ! C6 C5 T1
| +-----] [-----] [-----+
| DN DN DN TD

```

```

00:77/03 UPLOADHYD
- ( ) - M:5

```

```

00:112/12 NOZ_FILL
- J/E - M:7
- ( ) - M:5

```

```

00:112/17 HIHI_ALM
- J/E - M:10
- ( ) - M:5

```

REPORT OPTIONS SUMMARY

Page Width:	132
Page Length:	66
Graphics Capabilities:	NO
Context:	1
Right Power Rail:	YES
Address Comments:	YES
Symbols:	YES
Rung Comments:	NO
Cross References:	OUTPUTS ONLY
Starting Rung:	M:0
Ending Rung:	M:5

Allen-Bradley Co.
6200 Series Software
PLC-3 Programming Terminal Software
Release 1.5
Cross Reference Report

Station4 Program

14 March 1988 - 10:34

Address	Symbol / Instruction	Comment / Program File Number:Rurg Number
Label 1	-JSR- M:11 -LEL- S:0	File Averaging Procedure
00:77/03	UPLOADHYD -()- M:5	Upper Loader Hydraulic Solenoid
00:111/11	EMPTY_LITE -J [- M:1 -()- M:12	Tank EmptyIndicator Light
00:112/12	NOZ_FILL -J [- M:7 -()- M:5	Nozzle Fill Solenoid On
00:112/17	HIHI_ALM -J [- M:10 -()- M:5	Surge Tank High High LevelAlarm
00:135/12	TEMPSTORE -J [- M:11 -J [- M:8 -()- M:11 -(L)- M:10	Temporary Storage Point
10:13/02	CONVEY_RUN -J [- M:2 M:3	Conveyor Running
10:12/05	SEL_N_CUT -J [- M:7	Selector Switch Panel W North Cutter
10:12/12	NCUT_RUN -J [- M:6 M:11	North Cutter Running
10:16/05	PALLET_NF -J [- M:2	PalletizerNot Full
10:26/15	AIRSTOP_LS -J [- M:1 M:4 M:10	Air Stop Closed Limit Switch
10:31/07	BLOWDIFSW -J [- M:10 M:11	Blowback Differen- tial Switch
10:31/10	TOTALMACK -J [- M:10 -J [- M:11 M:12	Out of Tolerance Alarm Acknowledg
10:35/10	CALCENABLE -J [- S:0	Enable Calcula- tion

Station4 Program
Ladder Cross Reference

Address	Symbol / Instruction	Comment / Program File Number:Rung Number
10:45/15	RAPADVINK -J [- M:3 -J/[- M:4	Rapid Advance Transfer Interlock
10:64/05	HOP_LOLEV -J [- M:1 M:11 M:12 -J/[- M:10	Hopper LoLo Level
10:112/14	MANPURCOMP -J [- M:1 M:4	Manifold Purging Cycle Complete
10:114/11	GOODPART -J [- M:2 M:10	Good Part Sensor
10:114/15	BADPART -J [- M:3	Bad Part Sensor
10:134/03	EVAPBAKPSW -J/[- M:10	EvaporatorBack Pressure Switch
T1	BLOWBAKTIM -TON- M:8	Blowback Timer
T1/TD	BLOWBKDN -J [- M:4 M:5	Blowback Timer Done
T1/TE	BLOWBAKEN -J [- M:4 M:5	Blowback Timer Enabled
T1/TT	BLOWBAKTT -J [- M:4 M:5	Blowback Timer Timing
T2	RUNGCTRL -TON- S:0	Do Next Rung One Time Per Data Value
T2/TT	TIMER2TT -J [- S:1 -J/[- S:2	Rung Enabled When Timer2 is Timing
TPRE:2	NEXTRUNG1 -MOV- S:0	Do Next Rung One Time Per Data Value
T23	DWELLTIMER -TON- M:12	Dwell Timer
T23/TD	DWELLTIMDN -J [- M:11	Dwell Timer Done
TPRE:23/1	DWELL_LOLO -J [- M:10	Dwell Timer LoLo Time

Station 4 Program
Ladder Cross Reference

Address	Symbol / Instruction	Comment / Program File Number: Rung Number
C2	COUNTER2 -CTU- M:0	Counter 2
C2/EN	COUNTER2EN -(L)- M:0	Counter 2 Enable
C3	COUNTER3 -CTU- M:1	Counter 3
C3/DN	C3DONE -J [- M:1	Counter 3 Done
C4	TOTPULCNT -CTU- M:1	Totalizer Pulse Counter
C5	NUM_GOOD -CTD- M:3 -CTU- M:2	Quality Part Counter
C5/13	C5UNDERFL -J [- M:4 M:5	Counter 5 Underflow
C5/14	C5OVERFL -J [- M:4 M:5	Counter 5 Overflow
C5/DN	COUNTER5DN -J [- M:4 M:5	Counter 5 Done
C5/EN	COUNTERSEN -J [- M:4 M:5 -J/[- M:4	Counter 5 Enable
C6/13	C6UNDERFL -J [- M:4 M:5	Counter 6 Underflow
C6/14	C6OVERFL -J [- M:4 M:5 M:5	Counter 6 Overflow
C6/DN	COUNTER6DN -J [- M:4 M:5	Counter 6 Done
C6/EN	COUNTER6EN -J [- M:4 M:5	Counter 6 Enable
C8	COUNTER8 -CTU- M:11	Control Counter 8
C8/17	COUNTER8EN -J [- M:10	Counter 8 Enable
CACC:8/4	PASS1DN -J [- M:10	Pass 1 Complete

Station4 Program
Ladder Cross Reference

Address	Symbol / Instruction	Comment / Program File Number:Rung Number
C9	COUNTER9 -ADF- M:8	Control Counter 9
C10	COUNTER10 -MVF- M:9	Control Counter 10
C17	COUNTER17 -MVF- M:6	Prepare Optimiza- tion Tempera- tures
C18	COUNTER18 -MVF- M:7	Digester TemperaturSettings
C20	COUNTER20 -BIR- M:12	Control Counter 20
C21	COUNTER21 -ADF- M:9	Control Counter 21
#NO:0	EXTR_TEMP -MVF- M:6	Extruder Temp Constants
#NO:0/4	TEMP_FLAG -J [- M:10	Product B Upper Limit TemperaturFlag
#NO:0/72	EXTRTEMPOK -J [- M:11 M:12	Extruder TemperaturConstant OK
NO:0/4	ANAL_ON -J [- M:1	Analog Card Power On
#NO:1	EXTR_INTEM -MVF- M:7	Extruder Input Temp Settings
NO:1	INIT_TEMP -MOV- M:6	InitializeExtruder TemperaturSettings
NO:2	EXTROUTEMP -MOV- M:6	Extruder Output Temperatur
#N2:1	PROD_B_SET -MVF- M:6 M:7	Extruder Temp Settings For Product B
N2:1	DRYBELTEN -LIM- M:6 -MOV- M:7	Dryer Belt Tension Check
N2:3	PRESS_PROF -LIM- M:6 -MOV- M:7	pressure Profile For Hot Water Accumulatr
#N2:4	PROD_B_FLO -BIR- M:12	Cooling Water Flow Rates For Product B

Address	Symbol / Instruction	Comment / Program File Number:Rung Number
N2:4	SYS1_FLOW -LIM- M:6	System1 Cooling Water FlowRate
#N2:4/8	FLOW_RATE -()- M:10	Set Cooling Water Flow Rate Bit
F4:2	TAC_FDBK -LES- M:12	TachometerFeedback
F4:7	VEL_FDBK -LES- M:12 -MOV- M:6	Velocity Feedback
F4:7/15	VELFDBST -J [- M:6	Velocity Feedback Start
#D1:1	WT_PRECO -ADF- M:9 -MVF- M:9	Product Weights Before Coating Operation
D1:1	MAT_WT -ADD- M:9 -ADF- M:8 -MOV- M:8	Raw MateriWeight From UpperWeigh ScalFeeder
D1:1/11	LOWER_FDR -J [- M:8 -J/[- M:9 -()- M:9	Send Raw Material To Lower Weigh ScalFeeder
D2:0	STOREWORD -ADD- S:1 S:1 -DIV- S:1	Storage Word
D2:1	INCRVAL -ADD- S:1	Increment Value
#D2:2	WT_BIAS -ADF- M:9 -MVF- M:9	Product Weight Bias
D2:2	FILELENGTH -ADD- M:9 -DIV- S:1 -MOV- M:8 S:0	Input File Length
D2:2/2	TEST_CALC -J/[- M:8 -()- M:9	Test Calc

Station4 Program
Ladder Cross Reference

Address	Symbol / Instruction	Comment / Program File Number:Rung Number
D2:3	TEMPRESULT -DIV- S:1 -MOV- S:2	Temporary Result
D2:4	FINALRESULT -ADF- M:8 -MOV- S:2	Final Result
#D3:3	REGU_WTS -ADF- M:9	RegulationWeights
D3:3	DRUMFIL_SP -ADD- M:9 -ADF- M:8	Drum Vacuum Filter Speed Control
D3:3/3	DRUMFILFAS -(L)- M:8 -(U)- M:9	Drum Vacuum Filter Fast Speed
E0:29/15	RECIPE_VAR -J [- M:12 -J/[- M:7 -() - M:4	Reset Recipe Variances
E1:0	PROC_COMPL -MOV- M:6 -XOR- M:7 M:7 M:7	Process Complete Flags
B1:0/7	MEANSQ_COM -J [- M:6 -() - M:4	Mean Squarred Error Calc Complete
B1:0/11	DOWNL_COMP -J [- M:1 -J/[- M:7 -() - M:4	Autoclave Dye RecipeDownload Complete
B1:0/12	BACKUPCOMP -() - M:4 M:12	Backup Cycle Complete
#B1:2	GASFLOWXMT -BTR- M:7	Differen- tial Nitrogen Gas Flow Transmitter
A1:15/6	BAR_CODE -J [- M:9	Bar Code Check
H1:4/2	PROCCALC -J [- M:7 -J/[- M:10 -() - M:11	Begin 2nd Stage Process Calcula- tions

Station4 Program
Ladder Cross Reference

Address	Symbol / Instruction	Comment / Program File Number:Rung Number
PIND:1	DATAVALPT -ADD- S:1	Pointer To Data Values
PWRD:1	TODATAVAL -ADD- S:1 S:1	Pointer To Data Values

REPORT OPTIONS SUMMARY

Page Width:	132
Page Length:	66
Graphics Capabilities:	NO
Context:	1
Sort Order:	Address
Instruction Comments:	YES
Memories:	YES
Starting Address:	#00
Ending Address:	#S999

Allen-Bradley Co.
6200 Series Software
PLC-3 Programming Terminal Software

Release 1.5
Memory Map Report

Station4 Program

14 March 1988 - 12:43

Station4 Program
Memory Map Report

MEMORY MAP

CONTEXT # 1

SECTION	SIZE
DATA TABLE	5298
PROGRAM	454
MESSAGES	2632
SYSTEM SYMBOLS	188
CONVERTED PROCEDURES	0
FORCE TABLE	310

9416 OF 32768 WORDS USED, 23352 WORD(S) AVAILABLE.

DATA TABLE MAP

SECTION	LAST FILE	SIZE
OUTPUT	0	260
INPUT	0	260
TIMERS	0	76
COUNTERS	0	94
INTEGER	20	253
FLOATING POINT	4	36
HEX/BCD	3	1601
BINARY	5	291
ASCII	1	24
HIGH ORDER INTEGER	11	205
POINTERS	0	2010
STATUS FILES	3	160

OUTPUT MAP

FILE	LAST ADDRESS	SIZE	FILE	LAST ADDRESS	SIZE
0	00:00377	256			

260 WORD(S) USED IN 1 OUTPUT FILE(S)

INPUT MAP

FILE	LAST ADDRESS	SIZE	FILE	LAST ADDRESS	SIZE
0	10:00377	256			

260 WORD(S) USED IN 1 INPUT FILE(S)

TIMERS MAP

LAST ADDRESS SIZE
T23 72

76 WORDS USED IN THE TIMERS FILE

COUNTERS MAP

LAST ADDRESS SIZE
C29 90

94 WORDS USED IN THE COUNTERS FILE

INTEGER MAP

FILE	LAST ADDRESS	SIZE	FILE	LAST ADDRESS	SIZE	FILE	LAST ADDRESS	SIZE
0	N0:7	8	7	N7:51	52	10		0
1	N1:51	52	8		0	11		0
2	N2:66	67	9		0	12		0
3	N3:0	1				13		0
4		0				14		0
5		0				15		0
6		0				16		0
						17		0
						18		0
						19		0

253 WORD(S) USED IN 21 INTEGER FILE(S)

FLOATING POINT MAP

FILE	LAST ADDRESS	SIZE	FILE	LAST ADDRESS	SIZE	FILE	LAST ADDRESS	SIZE
0	F0:0	2	2		0	3	F3:0	2
1		0				4	F4:7	16

36 WORD(S) USED IN 5 FLOATING POINT FILE(S)

HEX/BOD MAP

FILE	LAST ADDRESS	SIZE	FILE	LAST ADDRESS	SIZE	FILE	LAST ADDRESS	SIZE
0	D0:10	11				2	D2:335	336
1	D1:334	335				3	D3:905	906

1601 WORD(S) USED IN 4 HEX/BOD FILE(S)

BINARY MAP

FILE	LAST ADDRESS	SIZE	FILE	LAST ADDRESS	SIZE	FILE	LAST ADDRESS	SIZE
0	B0:111	112	2	B2:143	144	3	B3:2	3
1	B1:11	12				4		0
						5	B5:0	1

291 WORD(S) USED IN 6 BINARY FILE(S)

ASCII MAP

FILE	LAST ADDRESS	SIZE	FILE	LAST ADDRESS	SIZE	FILE	LAST ADDRESS	SIZE
0	A0:0	1				1	A1:15	16

24 WORD(S) USED IN 2 ASCII FILE(S)

HIGH ORDER INTEGER MAP

FILE	LAST ADDRESS	SIZE	FILE	LAST ADDRESS	SIZE	FILE	LAST ADDRESS	SIZE
0	H0:63	128	4		0	6		0
1	H1:4	10	5		0	7		0
2		0				8		0
3		0				9		0
						10	H11:14	0
						11		30

205 WORD(S) USED IN 12 HIGH ORDER INTEGER FILE(S)

POINTERS MAP

LAST ADDRESS	SIZE
P1002	2006

2010 WORDS USED IN THE POINTERS FILE

STATUS FILES MAP

FILE	LAST ADDRESS	SIZE	FILE	LAST ADDRESS	SIZE	FILE	LAST ADDRESS	SIZE
0	S0:3	4				2	S2:7	8
1	S1:6	7				3	S3:127	128

160 WORD(S) USED IN 4 STATUS FILES

PROGRAM MAP

14 MAIN RUNG(S) USING 365 WORD(S)
5 SUBROUTINE RUNG(S) USING 44 WORD(S)
1 FAULT RUNG(S) USING 3 WORD(S)

MESSAGES MAP

1954 WORD(S) USED IN 37 REPORT GENERATION MESSAGES

0 WORD(S) USED IN 0 COMMENTS
25 WORD(S) USED IN 2 TERMINAL MACROS
650 WORD(S) USED IN 1 DATA HIGHWAY MESSAGES
0 WORD(S) USED IN 0 HELP MESSAGES

REPORT GENERATION MESSAGES MAP

MESSAGE NUMBER	SIZE
0	599
1	675
2	568
3	0
4	0
5	0
6	0
7	0
8	0
9	0
10	0
11	0
12	0
13	0
14	0
15	0
16	0
17	0
18	0
19	0
20	0
21	0
22	0
23	0
24	0
25	0
26	0
27	0

REPORT GENERATION MESSAGES MAP

MESSAGE NUMBER	SIZE
28	0
29	0
30	0
31	0
32	0
33	0
34	0
35	0
36	0

1954 WORD(S) USED IN 37 REPORT GENERATION MESSAGES FILE(S)

COMMENTS MAP

MESSAGE NUMBER	SIZE
0	0

0 WORD(S) USED IN 1 COMMENTS FILE(S)

TERMINAL MACROS MAP

MESSAGE NUMBER	SIZE
0	0
1	18

25 WORD(S) USED IN 2 TERMINAL MACROS FILE(S)

DATA HIGHWAY MESSAGES MAP

MESSAGE NUMBER	SIZE
0	646

650 WORD(S) USED IN 1 DATA HIGHWAY MESSAGES FILE(S)

HELP MESSAGES MAP

MESSAGE NUMBER	SIZE
0	0

0 WORD(S) USED IN 1 HELP MESSAGES FILE(S)

SYSTEM SYMBOLS MAP

SYMBOL NUMBER	SIZE
0	9
1	9
2	9
3	9
4	9
5	0
6	0
7	0
8	0
9	0
10	0
11	10
12	0
13	0
14	0
15	10
16	10
17	0
18	0
19	0
20	0
21	0
22	0
23	0
24	0
25	0
26	0
27	0
28	0
29	0
30	0
31	0
32	0
33	0
34	0
35	0
36	0
37	0
38	0
39	0

187 WORD(S) USED IN 40 SYSTEM SYMBOLS FILE(S)

CONVERTED PROCEDURES MAP

CONVERTED PROCEDURE NUMBER	SIZE
0	0

0 WORD(S) USED IN 1 CONVERTED PROCEDURES FILE(S)

FORCE TABLE MAP

INPUT RACK	SIZE	OUTPUT RACK	SIZE
0	16	0	16
1	16	1	16
2	16	2	16
3	16	3	16
4	16		
5	16		
6	16		
7	16		
10	16		
11	16		
12	16		
13	16		

310 WORD(S) USED IN 16 FORCE TABLE FILE(S)

REPORT OPTIONS SUMMARY

Page Width:
Page Length:
Graphics Capabilities:
Context:

132
66
NO
1

Allen-Bradley Co.
6200 Series Software
PLC-3 Programming Terminal Software
Release 1.5
Processor Status Report

Station4 Program

14 March 1988 - 12:15

OPERATING CONTEXT: 1
MONITORING CONTEXT: 1
ARITHMETIC STATUS 10000000 00001010
INSTRUCTION FAULT
ARITHMETIC FLAGS S: 1 Z: 0

MINOR FAULT (SYS) 00000000 00000000
(S0:2) 00000000 00000000
MAJOR FAULT (SYS) 00000000 00000000
(S0:1) 00000000 00000000

WHERE FAULTED
REAL TIME INTERRUPT 0 msec WATCHDOG SETPOINT 2550
PROGRAM SCAN [msec] last: 0 max: 40

MODE CONTROL (SYS) 10001001 00001000
(S0:3) 10001000 01010000

DATE/TIME 1988-03-14 12:38:14

REPORT OPTIONS SUMMARY

Page Width:	132
Page Length:	66
Graphics Capabilities:	NO
Context:	1

Allen-Bradley Co.
6200 Series Software
PLC-3 Programming Terminal Software
Release 1.5
I/O Status Report
Station4 Program

14 March 1988 - 11:20

RACK	QUARTER	FAULT	RETRY COUNT	RACK	QUARTER	FAULT	RETRY COUNT
000	1	1	0	014	1	0	0
000	2	0	0	014	2	0	0
000	3	0	0	014	3	0	0
000	4	0	0	014	4	0	0
001	1	1	0	015	1	1	0
001	2	0	0	015	2	0	0
001	3	0	0	015	3	0	0
001	4	0	0	015	4	0	0
002	1	1	0	016	1	1	0
002	2	0	0	016	2	0	0
002	3	0	0	016	3	0	0
002	4	0	0	016	4	0	0
003	1	1	0	017	1	1	0
003	2	0	0	017	2	0	0
003	3	0	0	017	3	0	0
003	4	0	0	017	4	0	0
004	1	1	0	020	1	1	0
004	2	0	0	020	2	0	0
004	3	0	0	020	3	0	0
004	4	0	0	020	4	0	0
005	1	1	0	021	1	1	0
005	2	0	0	021	2	0	0
005	3	0	0	021	3	0	0
005	4	0	0	021	4	0	0
006	1	0	0	022	1	1	0
006	2	0	0	022	2	0	0
006	3	0	0	022	3	0	0
006	4	0	0	022	4	0	0
007	1	0	0	023	1	0	0
007	2	0	0	023	2	0	0
007	3	0	0	023	3	0	0
007	4	0	0	023	4	0	0
010	1	0	0	024	1	0	0
010	2	0	0	024	2	0	0
010	3	0	0	024	3	0	0
010	4	0	0	024	4	0	0
011	1	0	0	025	1	0	0
011	2	0	0	025	2	0	0
011	3	0	0	025	3	0	0
011	4	0	0	025	4	0	0
012	1	0	0	026	1	0	0
012	2	0	0	026	2	0	0
012	3	0	0	026	3	0	0
012	4	0	0	026	4	0	0
013	1	0	0	027	1	0	0
013	2	0	0	027	2	0	0
013	3	0	0	027	3	0	0
013	4	0	0	027	4	0	0

RACK	QUARTER	FAULT	RETRY	COUNT
030	1	0		0
030	2	0		0
030	3	0		0
030	4	0		0
031	1	0		0
031	2	0		0
031	3	0		0
031	4	0		0
032	1	0		0
032	2	0		0
032	3	0		0
032	4	0		0
033	1	0		0
033	2	0		0
033	3	0		0
033	4	0		0
034	1	0		0
034	2	0		0
034	3	0		0
034	4	0		0
035	1	0		0
035	2	0		0
035	3	0		0
035	4	0		0
036	1	0		0
036	2	0		0
036	3	0		0
036	4	0		0
037	1	0		0
037	2	0		0
037	3	0		0
037	4	0		0

REPORT OPTIONS SUMMARY

Page Width:	132
Page Length:	66
Graphics Capabilities:	NO
Context:	1

Allen-Bradley Co.
6200 Series Software
PLC-3 Programming Terminal Software
Release 1.5
Data Table Report
Station4 Program

14 March 1988 - 11:20

Station4 Program
Data Table Report

octal addresses		binary data	
address	17	data	0
10:00000	0001	1110 1101 0011	0
10:00001	0001	0010 0011 0100	10:00060
10:00002	0011	0100 0101 1110	10:00061
10:00003	0100	0101 0001 1111	10:00062
10:00004	0000	1001 1000 0111	10:00063
10:00005	0000	0000 0110 0000	10:00064
10:00006	0010	1110 1010 0111	10:00065
10:00007	0100	0101 1011 1011	10:00066
10:00010	0000	0000 1001 1110	10:00067
10:00011	1100	1100 1001 1110	10:00070
10:00012	1011	1011 1101 1110	10:00071
10:00013	1011	1011 1101 0100	10:00072
10:00014	0000	1110 1101 0000	10:00073
10:00015	1101	1101 1110 0011	10:00074
10:00016	0011	0100 1110 1101	10:00075
10:00017	0101	0110 1011 1011	10:00076
10:00020	1010	1101 1101 1011	10:00077
10:00021	1101	1100 1011 1011	10:00100
10:00022	1011	1100 1110 1010	10:00101
10:00023	0010	0011 0110 0111	10:00102
10:00024	1000	0111 0110 0000	10:00103
10:00025	0010	0011 1110 0101	10:00104
10:00026	1101	1100 1011 0110	10:00105
10:00027	0001	0010 0011 1101	10:00106
10:00030	0010	0011 0011 0010	10:00107
10:00031	0000	0000 1000 0011	10:00110
10:00032	0110	0110 0001 0010	10:00111
10:00033	0101	0101 0010 0011	10:00112
10:00034	0111	0111 0011 0100	10:00113
10:00035	1001	1001 1110 1110	10:00114
10:00036	0000	0000 0101 0101	10:00115
10:00037	1101	1101 0110 0000	10:00116
10:00040	0010	0010 0011 0100	10:00117
10:00041	0010	0010 0011 0011	10:00120
10:00042	0100	0100 0011 0011	10:00121
10:00043	1111	1111 1110 1110	10:00122
10:00044	0010	0010 0011 0100	10:00123
10:00045	1110	1110 0100 0100	10:00124
10:00046	0011	0011 0100 0101	10:00125
10:00047	0100	0100 1110 1110	10:00126
10:00050	0100	0101 0110 0111	10:00127
10:00051	0101	0101 0110 0110	10:00130
10:00052	0100	0011 0010 0001	10:00131
10:00053	1111	1111 1110 1110	10:00132
10:00054	1010	1010 0010 0011	10:00133
10:00055	1110	1110 0101 0110	10:00134
10:00056	0000	0000 0101 0111	10:00135
10:00057	1110	1110 1110 1110	10:00136
			10:00137

17	data	0
1110	1110 1010 1010	10:00060
0011	0100 0101 0110	10:00061
0110	0101 0100 0011	10:00062
1101	1101 1110 1110	10:00063
1110	1110 0011 0100	10:00064
1101	1101 0100 0101	10:00065
0000	0111 1000 1001	10:00066
1101	1101 1101 1101	10:00067
0010	0011 0100 0101	10:00070
0101	0100 0011 0010	10:00071
0111	0101 0100 0011	10:00072
1111	1111 0101 0101	10:00073
1111	1111 0100 0101	10:00074
1101	1101 0101 0110	10:00075
0000	0100 0101 0110	10:00076
1100	1100 1100 1100	10:00077
0011	0100 0101 0110	10:00100
0111	0110 0101 0100	10:00101
1110	1110 0011 0011	10:00102
1111	1111 0111 1000	10:00103
1101	1101 0110 0111	10:00104
1111	1110 1110 0011	10:00105
1010	1010 1010 1010	10:00106
1000	1000 1000 0110	10:00110
1110	1110 1101 1101	10:00111
0101	0101 0110 0110	10:00112
0110	0110 0011 0011	10:00113
1101	1101 0011 0100	10:00114
1110	1110 0100 0101	10:00115
1110	1110 1110 1110	10:00116
0000	0000 0000 0001	10:00117
0101	0101 0011 0011	10:00120
1010	1010 1110 1110	10:00121
1000	1000 1000 0110	10:00122
1111	1111 0011 0100	10:00123
1100	1100 0010 0011	10:00124
1110	1110 0010 0011	10:00125
0100	0100 0100 0100	10:00126
1011	1011 1011 1011	10:00127
0111	0111 0101 0101	10:00130
1101	1101 1110 1110	10:00131
0000	0000 1000 1000	10:00132
1111	1111 0100 0101	10:00133
1100	1100 0011 0111	10:00134
1100	1100 0101 0110	10:00135
0101	0101 0101 0101	10:00136
0000	0000 0000 0010	10:00137

octal addresses binary data

address	17	data	0	address	17	data	0
10:00140	1001	1001	0101	10:00220	0000	1010	1011
10:00141	0011	0011	0100	10:00221	0011	0100	0101
10:00142	1000	0000	0110	10:00222	0110	0111	1000
10:00143	1101	1101	0101	10:00223	0000	0010	1010
10:00144	1101	1101	0101	10:00224	1011	1011	1110
10:00145	0100	0101	1101	10:00225	0000	0110	0111
10:00146	0000	0000	0000	10:00226	1011	1101	1110
10:00147	0000	0000	0010	10:00227	0000	0000	0011
10:00150	1110	1110	0100	10:00230	1110	1110	1111
10:00151	0100	0100	0101	10:00231	0010	0011	0100
10:00152	1110	0011	0100	10:00232	0100	0101	0110
10:00153	1110	1110	0100	10:00233	0100	0011	1110
10:00154	1101	1101	1000	10:00234	1100	1100	1110
10:00155	0011	0100	1110	10:00235	1000	1001	0000
10:00156	1101	1101	1101	10:00236	1110	1110	0100
10:00157	1101	1101	1011	10:00237	0000	0000	0110
10:00160	0101	0101	0010	10:00240	0100	1010	1111
10:00161	1000	1000	0011	10:00241	0110	0110	0101
10:00162	0000	1101	1110	10:00242	1101	1101	1010
10:00163	1110	1110	0111	10:00243	0110	0101	1110
10:00164	1101	1101	1001	10:00244	1110	1110	1100
10:00165	0011	0100	1110	10:00245	0000	0111	0101
10:00166	1110	1110	1110	10:00246	1010	1010	0011
10:00167	1011	1011	1011	10:00247	0000	0000	1101
10:00170	0100	0100	0101	10:00250	0000	0000	0000
10:00171	0101	0101	0010	10:00251	0111	0111	0110
10:00172	0000	0100	0101	10:00252	1101	1101	1100
10:00173	0100	0101	0110	10:00253	0101	0110	0111
10:00174	0110	1010	0010	10:00254	1011	1011	1010
10:00175	0101	0111	1101	10:00255	0000	0100	0101
10:00176	1111	1111	0100	10:00256	0100	0101	0110
10:00177	0101	1101	1101	10:00257	0000	1000	1001
10:00200	0001	0010	0011	10:00260	1110	0011	0011
10:00201	0010	0011	0100	10:00261	1001	1001	0111
10:00202	0101	0110	0111	10:00262	1100	1100	1100
10:00203	0100	0101	0111	10:00263	0011	0100	0101
10:00204	1110	1110	1011	10:00264	1101	1101	1110
10:00205	0100	0101	0110	10:00265	1000	1001	0000
10:00206	0010	0011	0100	10:00266	0000	1001	1000
10:00207	0001	0010	0011	10:00267	0000	0110	0111
10:00210	1010	1101	1100	10:00270	0001	0001	0011
10:00211	0101	0101	0011	10:00271	1001	1001	0111
10:00212	0010	0011	0100	10:00272	1110	1110	1100
10:00213	0001	1010	1010	10:00273	0110	0110	0010
10:00214	1011	1011	1110	10:00274	0011	0100	0101
10:00215	1001	0000	1000	10:00275	0110	0111	1000
10:00216	1101	1110	0011	10:00276	0000	0101	0100
10:00217	0000	0000	0010	10:00277	0110	0101	0100

octal addresses binary data

address	17	data	0
10:00300	0001	0010 0011 0100	0
10:00301	0110	0110 0101 0101 0101	
10:00302	1110	1110 1101 1101 1010	
10:00303	0101	0101 1000 1000 1000	
10:00304	0101	0110 0111 1000 1000	
10:00305	0000	1001 1000 0111 0000	
10:00306	0000	1000 1001 0011 0011	
10:00307	0101	0010 0001 0001 0001	
10:00310	0011	0100 0101 0110 0110	
10:00311	0101	0100 0011 0010 0010	
10:00312	1110	1110 1101 1011 1010	
10:00313	0010	0010 0110 0110 0110	
10:00314	1000	1001 0000 0000 0000	
10:00315	1001	1000 0111 0111 0111	
10:00316	0000	0100 0101 0110 0110	
10:00317	0100	0100 0101 0101 0101	
10:00320	0100	0101 0110 0111 0111	
10:00321	0010	0011 0100 0001 0001	
10:00322	0011	0100 0101 1101 1101	
10:00323	0100	0100 0010 0010 0010	
10:00324	1001	1001 0000 0000 0000	
10:00325	1111	1111 1110 1110 1110	
10:00326	0000	0010 0011 0100 0100	
10:00327	0000	0000 0101 0101 0101	
10:00330	0101	0110 0111 1000 1000	
10:00331	0111	0110 0101 0100 0100	
10:00332	0100	0101 0110 0111 0111	
10:00333	0101	0101 0011 0011 0011	
10:00334	0110	0110 0000 0000 0000	
10:00335	1011	1011 1110 1110 1110	
10:00336	0000	0000 0101 0110 0110	
10:00337	0011	0100 0000 0000 0000	

17	data	0
0101	0110 0111 1000	
0110	0101 0100 0011	
0110	0111 0110 1000	
0111	0111 1000 1000	
0000	0000 1000 1000	
0011	0011 0100 0100	
0000	0000 0111 0110	
0000	0000 0000 0000	
0001	0011 0100 0101	
0101	0100 0011 0010	
0111	1000 1001 0000	
1110	1110 0011 0011	
0000	0000 0101 0101	
0101	0101 0110 0110	
0000	0000 0111 1000	
0000	0000 0000 0000	
0010	0010 0011 0011	
0110	0101 0100 0011	
0000	0100 0101 0110	
0110	0110 0101 0101	
0000	0000 0011 0011	
0110	0110 0111 0111	
1110	1110 0011 0011	
0000	0000 1000 0111	
1110	1110 1010 1010	
0000	1000 1001 0111	
0000	0010 0011 0100	
0100	0100 0101 0101	
1001	0000 1000 0111	
0100	0100 0101 0101	
0000	0000 0000 0100	
0000	0000 0110 0101	

REPORT OPTIONS SUMMARY

Page Width:	132
Page Length:	66
Graphics Capabilities:	NO
Context:	1
Starting Address:	#10
Ending Address:	#10

Allen-Bradley Co.
6200 Series Software
PLC-3 Programming Terminal Software
Release 1.5
Data Table Report
Station4 Program

14 March 1988 - 13:52

Station4 Program
Data Table Report

decimal addresses	floating point data		
address	1	2	3
FO:0	0.000000		4

Station4 Program
Data Table Report

Data Table	File #F1	NOT IN USE
Data Table	File #F2	NOT IN USE
Data Table	File #F3	NOT IN USE

Station4 Program
Data Table Report

decimal addresses		floating point data			
address	0	1	2	3	4
F4:0	234.550000	567.223300	112.567100	114.456300	123.643600
F4:5	117.239600	122.176500	118.326700		

REPORT OPTIONS SUMMARY

Page Width:	132
Page Length:	66
Graphics Capabilities:	NO
Context:	1
Starting Address:	#F0
Ending Address:	#F4

Allen-Bradley Co.
6200 Series Software
PLC-3 Programming Terminal Software
Release 1.5
Force Status Report
Station4 Program

14 March 1988 -- 13:52

OUTPUT FORCE STATUS

address	17	data	0	address	17	data	0
00:00000				00:00060	....	....	....
00:00001				00:00061	1	....	....
00:00002				00:00062	....	....	....
00:00003		1	....	00:00063	....	....	....
00:00004				00:00064	....	....	....
00:00005				00:00065	....	....0	1
00:00006				00:00066	....	....	....
00:00007		1	....	00:00067	....	....	....
00:00010				00:00070	....	....	....
00:00011				00:00071	....	....0	....
00:00012		1	....	00:00072	....	....	....
00:00013				00:00073	....	....	....
00:00014				00:00074	....	....	....
00:00015				00:00075	....	....	....
00:00016				00:00076	....	....	....
00:00017				00:00077	....	....	....
00:00020				00:00100	....	....	....
00:00021	1	1010	1	00:00101	....	....	....
00:00022		1	....	00:00102	....	....	....
00:00023				00:00103	....	....	....
00:00024				00:00104	....	....1	....
00:00025				00:00105	....	....	....
00:00026		1	0	00:00106	....	....	....
00:00027				00:00107	....	....	....
00:00030			1	00:00110	....	....	....1
00:00031		0	....	00:00111	....	....	....
00:00032				00:00112	....	....	....
00:00033				00:00113	....	....	....
00:00034	1	0110	....	00:00114	....	....0	....
00:00035			1	00:00115	....	....	....
00:00036				00:00116	....	....	....
00:00037				00:00117	....	....	....
00:00040		1	....	00:00120	....	....	....
00:00041				00:00121	....	....1	....
00:00042				00:00122	....	....	....
00:00043				00:00123	....	....	....
00:00044				00:00124	....	....	....
00:00045			0	00:00125	....	....	....
00:00046				00:00126	....	....	....
00:00047				00:00127	....	....1	....
00:00050		1	....	00:00130	....	....	....
00:00051				00:00131	....	....0	....
00:00052				00:00132	....	....	....
00:00053				00:00133	....	....	....
00:00054				00:00134	....	....	....1
00:00055				00:00135	....	....	....
00:00056				00:00136	....	....	....
00:00057				00:00137	....	....	....

OUTPUT FORCE STATUS

address	17	data	0	address	17	data	0
00:00140		1...	....	00:00220	....	....	0
00:00141				00:00221	....	....	....
00:00142				00:00222	....	....	0
00:00143				00:00223	....	....	....
00:00144			0.	00:00224	....	....	....
00:00145				00:00225	....	....	....
00:00146				00:00226	....	....	....
00:00147			1.	00:00227	....	....	1.
00:00150				00:00230	....	....	....
00:00151				00:00231	....	....	....
00:00152				00:00232	....	....	....
00:00153				00:00233	....	....	0
00:00154				00:00234	....	....	....
00:00155			1.	00:00235	....	....	....
00:00156				00:00236	....	....	1.
00:00157				00:00237	....	....	....
00:00160				00:00240	....	....	....
00:00161		0.	....	00:00241	....	....	....
00:00162				00:00242	....	....	....
00:00163				00:00243	....	....	....
00:00164				00:00244	....	....	....
00:00165				00:00245	....	1.	....
00:00166				00:00246	....	....	....
00:00167			1.	00:00247	....	....	....
00:00170				00:00250	....	....	....
00:00171				00:00251	....	....	....
00:00172				00:00252	....	....	1.
00:00173				00:00253	....	....	....
00:00174			1.	00:00254	....	....	....
00:00175				00:00255	....	....	....
00:00176			0.	00:00256	....	1.	....
00:00177				00:00257	....	....	....
00:00200				00:00260	....	....	....
00:00201				00:00261	....	....	....
00:00202				00:00262	....	1.	....
00:00203				00:00263	....	....	....
00:00204				00:00264	....	....	....
00:00205				00:00265	....	....	....
00:00206			0.	00:00266	....	....	....
00:00207				00:00267	....	....	....
00:00210				00:00270	....	....	....
00:00211				00:00271	....	....	....
00:00212		0.	....	00:00272	....	....	....
00:00213				00:00273	....	1.	....
00:00214				00:00274	....	....	....
00:00215				00:00275	....	....	....
00:00216			0	00:00276	....	....	....
00:00217				00:00277	....	....	....

OUTPUT FORCE STATUS

address	17	data	0	address	17	data	0
00:00300				00:00360	....	....	....
00:00301				00:00361	....	....	....
00:00302				00:00362	....	....	....
00:00303				00:00363	....	....	0..
00:00304			0..	00:00364	....	....	0..
00:00305				00:00365	....	....	0..
00:00306				00:00366	....	....	....
00:00307				00:00367	....	....	....
00:00310				00:00370	....	1	....
00:00311				00:00371	....	....	....
00:00312				00:00372	....	....	....
00:00313		1..	....	00:00373	....	....	....
00:00314				00:00374	....	....	....
00:00315				00:00375	....	....	....
00:00316				00:00376	....	....	....
00:00317				00:00377	....	....	....
00:00320							
00:00321							
00:00322							
00:00323							
00:00324							
00:00325							
00:00326		0..	....				
00:00327							
00:00330							
00:00331		1..	....				
00:00332							
00:00333			1..				
00:00334							
00:00335							
00:00336							
00:00337			1..				
00:00340			..11				
00:00341			..				
00:00342							
00:00343							
00:00344							
00:00345							
00:00346							
00:00347			1..				
00:00350							
00:00351							
00:00352							
00:00353			0..				
00:00354							
00:00355							
00:00356							
00:00357		1..	....				

INPUT FORCE STATUS

address	17	data	0	address	17	data	0
I0:00000			1	I0:00060	....	....	....
I0:00001			0	I0:00061	....	....	....
I0:00002			1	I0:00062	....	....	....1
I0:00003			1..0..	I0:00063	....	....0..	....
I0:00004				I0:00064	....	....	....
I0:00005			0..	I0:00065	....	....	....
I0:00006				I0:00066	....	....	....0..
I0:00007			1..0..	I0:00067	....	....	....
I0:00010				I0:00070	....	....	....
I0:00011				I0:00071	....	....	....
I0:00012				I0:00072	....	....	....0..
I0:00013			1..0..	I0:00073	....	....	....
I0:00014				I0:00074	....	....	....
I0:00015				I0:00075	....	....	....
I0:00016			1..	I0:00076	....	....	....
I0:00017				I0:00077	....	....	....
I0:00020				I0:00100	....	....	....1..
I0:00021			1..1..	I0:00101	....	....	....0..
I0:00022				I0:00102	....	....	....0..
I0:00023			1..	I0:00103	....	....	....1..
I0:00024				I0:00104	....	....	....
I0:00025				I0:00105	....	....0..	....
I0:00026				I0:00106	....	....	....
I0:00027				I0:00107	....	....	....1..
I0:00030			1..1..	I0:00110	....	....	....0..
I0:00031			1..1..	I0:00111	....	....	....
I0:00032			1..	I0:00112	....	....	....0..
I0:00033				I0:00113	....	....	....
I0:00034				I0:00114	....	....	....
I0:00035				I0:00115	....	....	....
I0:00036				I0:00116	....	....	....
I0:00037			1..1..	I0:00117	....	....	....
I0:00040			1..	I0:00120	....	....	....
I0:00041				I0:00121	....	....	....
I0:00042				I0:00122	....	....	....1..
I0:00043			0..	I0:00123	....	....	....
I0:00044			1..	I0:00124	....	....	....
I0:00045			0..	I0:00125	....	....	....
I0:00046				I0:00126	....	....	....1..
I0:00047			1..	I0:00127	....	....	....1..
I0:00050				I0:00130	....	....	....
I0:00051				I0:00131	....	....	....
I0:00052			1..	I0:00132	....	....	....1..
I0:00053				I0:00133	....	....	....
I0:00054				I0:00134	....	....	....1..
I0:00055				I0:00135	....	....	....
I0:00056				I0:00136	....	....	....1..
I0:00057				I0:00137	....	....	....

INPUT FORCE STATUS

address	17	data	0	address	17	data	0
I0:00140				I0:00220	....	....	....
I0:00141				I0:00221	....	....	....
I0:00142				I0:00222	....	....	....
I0:00143				I0:00223	....	....	....
I0:00144				I0:00224	....	....	....
I0:00145		1.	....	I0:00225	....	....	....
I0:00146				I0:00226	....	....	....
I0:00147				I0:00227	....	....	....
I0:00150				I0:00230	....	....	....
I0:00151				I0:00231	....	....	....
I0:00152				I0:00232	....	....	....
I0:00153		1.	0.	I0:00233	....	....	....
I0:00154				I0:00234	....	....	....
I0:00155				I0:00235	....	....	....
I0:00156				I0:00236	....	....	....
I0:00157				I0:00237	....	....	....
I0:00160				I0:00240	....	....	....
I0:00161				I0:00241	....	....	....
I0:00162				I0:00242	....	....	....
I0:00163		1.	....	I0:00243	....	....	....
I0:00164				I0:00244	....	....	....
I0:00165				I0:00245	....	....	....
I0:00166				I0:00246	....	....	....
I0:00167			1.	I0:00247	....	....	....
I0:00170				I0:00250	....	....	....
I0:00171				I0:00251	....	....	....
I0:00172				I0:00252	....	....	....
I0:00173				I0:00253	....	....	....
I0:00174				I0:00254	....	....	....
I0:00175				I0:00255	....	....	....
I0:00176				I0:00256	....	....	....
I0:00177				I0:00257	....	....	....
I0:00200				I0:00260	....	....	....
I0:00201				I0:00261	....	....	....
I0:00202				I0:00262	....	....	....
I0:00203				I0:00263	....	....	....
I0:00204				I0:00264	....	....	....
I0:00205				I0:00265	....	....	....
I0:00206				I0:00266	....	....	....
I0:00207				I0:00267	....	....	....
I0:00210				I0:00270	....	....	....
I0:00211				I0:00271	....	....	....
I0:00212				I0:00272	....	....	....
I0:00213				I0:00273	....	....	....
I0:00214				I0:00274	....	....	....
I0:00215				I0:00275	....	....	....
I0:00216				I0:00276	....	....	....
I0:00217				I0:00277	....	....	....

INPUT FORCE STATUS

address	17	data	0	address	17	data	0
10:00300				10:00360	....	....	....
10:00301				10:00361	....	....	....
10:00302				10:00362	....	....	....
10:00303				10:00363	....	....	....
10:00304				10:00364	....	....	....
10:00305				10:00365	....	....	....
10:00306				10:00366	....	....	....
10:00307				10:00367	....	....	....
10:00310				10:00370	....	....	....
10:00311				10:00371	....	....	....
10:00312				10:00372	....	....	....
10:00313				10:00373	....	....	....
10:00314				10:00374	....	....	....
10:00315				10:00375	....	....	....
10:00316				10:00376	....	....	....
10:00317				10:00377	....	....	....
10:00320							
10:00321							
10:00322							
10:00323							
10:00324							
10:00325							
10:00326							
10:00327							
10:00330							
10:00331							
10:00332							
10:00333							
10:00334							
10:00335							
10:00336							
10:00337							
10:00340							
10:00341							
10:00342							
10:00343							
10:00344							
10:00345							
10:00346							
10:00347							
10:00350							
10:00351							
10:00352							
10:00353							
10:00354							
10:00355							
10:00356							
10:00357							

REPORT OPTIONS SUMMARY

Page Width:	132
Page Length:	66
Graphics Capabilities:	NO
Context:	1

Allen-Bradley Co.
6200 Series Software
PLC-3 Programming Terminal Software
Release 1.5
Symbol Table Report

Station4 Program

14 March 1988 - 10:27

Station4 Program
Symbol Table Report

14 March 1988 page 2
Symbol AIRSTOP_LS

Symbol	Address	Comment
AIRSTOP_LS	I0:EG/15	Air Stop Closed Limit Switch
ANAL_ON	N0:0/4	Analog Card Power On
BACKUPCOMP	B1:0/12	Backup Cycle Complete
BADPART	I0:114/15	Bad Part Sensor
BAR_CODE	A1:15/6	Bar Code Check
BLOWBKDN	T1/TD	Blowback Timer Done
BLOWBAKEN	T1/TE	Blowback Timer Enabled
BLOWBAKTIM	T1	Blowback Timer
BLOWBAKTT	T1/TT	Blowback Timer Timing
BLOWDIFSW	I0:31/07	Blowback Differential Switch
C3DONE	C3/DN	Counter 3 Done
C5OVERFL	C5/14	Counter5 Overflow
C6OVERFL	C5/13	Counter5 Underflow
C6UNDERFL	C6/14	Counter6 Overflow
C6UNDERFL	C6/13	Counter6 Underflow
CALCENABLE	I0:35/10	Enable Calculation
CONVEY_RUN	I0:3/02	Conveyor Running
COUNTER10	C10	Control Counter 10
COUNTER17	C17	Prepare Optimization Temperatures
COUNTER18	C18	Digester Temperature Settings
COUNTER2	C2	Counter2
COUNTER20	C20	Control Counter 20
COUNTER21	C21	Control Counter 21
COUNTER2EN	C2/EN	Counter 2 Enable
COUNTER3	C3	Counter 3
COUNTER5DN	C5/DN	Counter5 Done
COUNTERSEN	C5/EN	Counter5 Enable
COUNTER6DN	C6/DN	Counter6 Done
COUNTER6EN	C6/EN	Counter6 Enable
COUNTER8	C8	Control Counter 8
COUNTER8EN	C8/17	Counter8 Enable
COUNTER9	C9	Control Counter 9
DATVALPT	PIND:1	Pointer To Data Values
DOWNL_COMP	B1:0/11	Autoclave Dye Recipe Download Complete
DRUMFILFAS	D3:3/3	Drum Vacuum Filter Fast Speed
DRUMFIL_SP	D3:3	Drum Vacuum Filter Speed Control
DRYBELTEN	N2:1	Dryer Belt Tension Check
DWELLTIMDN	T23/TD	Dwell Timer Done
DWELLTIMER	T23	Dwell Timer
DWELL_LOLD	TPRE:23/1	Dwell Timer LoLo Time
EMPTY_LITE	D0:111/11	Tank Empty Indicator Light
EVAPBAKPSW	I0:134/03	Evaporator Back Pressure Switch
EXTROUTEMP	N0:2	Extruder Output Temperature
EXTRTEMPOK	N0:0/72	Extruder Temperature Constant OK
EXTR_INTEN	N0:1	Extruder Input Temp Settings
EXTR_TEMP	N0:0	Extruder Temp Constants
FILELENGTH	D2:2	Input File Length
FINALRESUL	D2:4	Final Result
FLOW_RATE	N2:4/8	Set Cooling Water Flow Rate Bit
GASFLOWXMT	#B1:2	Differential Nitrogen Gas Flow Transmitter
GOODPART	I0:114/11	Good Part Sensor
HIHI_ALM	D0:112/17	Surge Tank High Level Alarm
HOP_LOLEV	I0:64/05	Hopper LoLo Level

Symbol	Address	Comment
INCRVAL	D2:1	Increment Value
INIT_TEMP	N0:1	InitializeExtruder TemperaturSettings
LOMER_FDR	D1:1/11	Send Raw Material To Lower Weigh ScalFeeder
MANPURCOMP	I0:112/14	Manifold Purging Cycle Complete
MAT_WT	D1:1	Raw MaterialWeight From UpperWeigh ScalFeeder
MEANSQ_COM	B1:0/7	Mean SquarredError Calc Complete
NEXT_RUN	I0:12/12	North Cutter Running
NEXTRUNG1	TPE:2	Do Next Rung One Time Per Data Value
NOZ_FILL	O0:112/12	Nozzle Fill Solenoid On
NUM_GOOD	C5	Quality Part Counter
PALLET_NF	I0:16/05	PalletizerNot Full
PASSIDN	CACC:8/4	Pass 1 Complete
PRESS_PROF	N2:3	Pressure Profile For Hot Water Accumulatr
PROC2CALC	H1:4/2	Begin End Stage Process Calcula- tions
PROC_COMPL	B1:0	Process Complete Flags
PROD_B_FLD	#NE:4	Cooling Water Flow Rates For Product B
PROD_B_SET	#NE:1	Extruder Temp Settings For Product B
RAPADVINK	I0:45/15	Rapid Advance Transfer Interlock
RECIPE_VAR	B0:29/15	Reset Recipe Variances
REGU_WTS	#D3:3	RegulationWeights
RUNGCTRL	T2	Do Next Rung One Time Per Data Value
SEL_N_CUT	I0:12/05	Selector Switch Panel W North Cutter
STOREWORD	D2:0	Storage Word
SYS1_FLOW	N2:4	System1 Cooling Water FlowRate
TAC_FDBK	F4:2	TachometerFeedback
TEMPRESULT	D2:3	Temporary Result
TEMPSTORE	O0:135/12	Temporary Storage Point
TEMP_FLAG	#N0:0/4	Product B Upper Limit TemperaturFlag
TEST_CALC	D2:2/2	Test Calc
TIMER2TT	T2/TT	Rung Enabled When Timer2 is Timing
TODATAVAL	PWRD:1	Pointer To Data Values
TOLALMACK	I0:31/10	Out of Tolerance Alarm Acknowledg
TOTPULCNT	C4	Totalizer Pulse Counter
UPLOADHYD	O0:77/03	Upper Loader Hydraulic Solenoid
VELFDEST	F4:7/15	Velocity Feedback Start
VEL_FDBK	F4:7	Velocity Feedback
WT_BIAS	#D2:2	Product Weight Bias
WT_PRECO	#D1:1	Product Weights Before Coating Operation

REPORT OPTIONS SUMMARY

Page Width:	132
Page Length:	66
Graphics Capabilities:	NO
Context:	1
Sort Order:	Symbol
Instruction Comments:	YES
Mnemonics:	NO

Allen-Bradley Co.
6200 Series Software
PLC-3 Programming Terminal Software
Release 1.5
Unused Addresses Report

Station4 Program

14 March 1988 - 10:27

Station4 Program
Unused Addresses Report

14 March 1988 Page 2
Address 00:12/12

Address	Symbol / Instruction	Comment
00:2/12		
00:11/06		
00:143/12		
10:1/05		
10:11/01		
10:11/02		
10:11/03		
10:11/04		
10:11/07		
10:23/15		
10:214/03		
TPRE:1		
TPRE:23/2		
N0:0/0		
N2:4/10		
N7:3/14		
#F3:0		
D0:10/0		
#B2:134		
#B5:0		
H33:14/2		
	comment-6	
	Temporary Storage Point	
	comment-5	
	comment-1	
	comment-2	
	comment-3	
	comment-4	
	comment-7	
	EvaporatorBack Pressure Switch	
	EvaporatorBack Pressure Switch	
	Do Next Rung One Time Per Data Value	
	Dwell Timer Time Low	
	Extruder Temp Check	
	System1 Flow Rate Select	
	Product Variance OK	
	Nitrogen Gas Flow	
	analog card power upbit on	
	Read From Square Root Extractor	
	Inventory Bar Codes	
	Second Stage CalculationReady	
	EVAPBPSW	
	EXTRTEMPCH	
	SYS1FLSEL	
	NITRGASFL	
	POWER_ON	
	-J [-	
	INVBARCOD	

REPORT OPTIONS SUMMARY

Page Width:	132
Page Length:	66
Graphics Capabilities:	NO
Context:	1
Sort Order:	Address
Instruction Comments:	YES
Mnemonics:	YES

Allen-Bradley Co.
6200 Series Software
PLC-3 Programming Terminal Software
Release 1.5
Memory Usage Report

Station4 Program

14 March 1988 - 11:35

X = used address
x = bit used as part of word . = unused address

	17	0	Word
IO:140	.	.	.
IO:141	.	.	.
IO:142	.	.	.
IO:143	.	.	.
IO:144	.	.	.
IO:145	.	.	.
IO:146	.	.	.
IO:147	.	.	.
IO:150	.	.	.
IO:151	.	.	.
IO:152	.	.	.
IO:153	.	.	.
IO:154	.	.	.
IO:155	.	.	.
IO:156	.	.	.
IO:157	.	.	.
IO:160	.	.	.
IO:161	.	.	.
IO:162	.	.	.
IO:163	.	.	.
IO:164	.	.	.
IO:165	.	.	.
IO:166	.	.	.
IO:167	.	.	.
IO:170	.	.	.
IO:171	.	.	.
IO:172	.	.	.
IO:173	.	.	.
IO:174	.	.	.
IO:175	.	.	.
IO:176	.	.	.
IO:177	.	.	.
IO:200	.	.	.
IO:201	.	.	.
IO:202	.	.	.
IO:203	.	.	.
IO:204	.	.	.
IO:205	.	.	.
IO:206	.	.	.
IO:207	.	.	.
IO:210	.	.	.
IO:211	.	.	.
IO:212	.	.	.
IO:213	.	.	.
IO:214	.	.	.
IO:215	.	.	.
IO:216	.	.	.
IO:217	.	.	.

X = used address . = unused address
x = bit used as part of word

	17	0	Word
10:220	.	.	.
10:221	.	.	.
10:222	.	.	.
10:223	.	.	.
10:224	.	.	.
10:225	.	.	.
10:226	.	.	.
10:227	.	.	.
10:228	.	.	.
10:229	.	.	.
10:230	.	.	.
10:231	.	.	.
10:232	.	.	.
10:233	.	.	.
10:234	.	.	.
10:235	.	.	.
10:236	.	.	.
10:237	.	.	.
10:240	.	.	.
10:241	.	.	.
10:242	.	.	.
10:243	.	.	.
10:244	.	.	.
10:245	.	.	.
10:246	.	.	.
10:247	.	.	.
10:250	.	.	.
10:251	.	.	.
10:252	.	.	.
10:253	.	.	.
10:254	.	.	.
10:255	.	.	.
10:256	.	.	.
10:257	.	.	.
10:260	.	.	.
10:261	.	.	.
10:262	.	.	.
10:263	.	.	.
10:264	.	.	.
10:265	.	.	.
10:266	.	.	.
10:267	.	.	.
10:270	.	.	.
10:271	.	.	.
10:272	.	.	.
10:273	.	.	.
10:274	.	.	.
10:275	.	.	.
10:276	.	.	.
10:277	.	.	.

17	0	Words
10:300	.	.
10:301	.	.
10:302	.	.
10:303	.	.
10:304	.	.
10:305	.	.
10:306	.	.
10:307	.	.
10:310	.	.
10:311	.	.
10:312	.	.
10:313	.	.
10:314	.	.
10:315	.	.
10:316	.	.
10:317	.	.
10:320	.	.
10:321	.	.
10:322	.	.
10:323	.	.
10:324	.	.
10:325	.	.
10:326	.	.
10:327	.	.
10:330	.	.
10:331	.	.
10:332	.	.
10:333	.	.
10:334	.	.
10:335	.	.
10:336	.	.
10:337	.	.
10:340	.	.
10:341	.	.
10:342	.	.
10:343	.	.
10:344	.	.
10:345	.	.
10:346	.	.
10:347	.	.
10:350	.	.
10:351	.	.
10:352	.	.
10:353	.	.
10:354	.	.
10:355	.	.
10:356	.	.
10:357	.	.

X = used address
x = bit used as part of word
• = unused address

17	Word	0	Word
IO:360	.	.	.
IO:361	.	.	.
IO:362	.	.	.
IO:363	.	.	.
IO:364	.	.	.
IO:365	.	.	.
IO:366	.	.	.
IO:367	.	.	.
IO:370	.	.	.
IO:371	.	.	.
IO:372	.	.	.
IO:373	.	.	.
IO:374	.	.	.
IO:375	.	.	.
IO:376	.	.	.
IO:377	.	.	.

Station4 Program
Memory Usage Report

14 March 1988 Page 8
Summary

REPORT OPTIONS SUMMARY

Page Width:	132
Page Length:	66
Graphics Capabilities:	NO
Context:	1
Starting Address:	#10
Ending Address:	#10

Allen-Bradley Co.
6200 Series Software
PLC-3 Programming Terminal Software
Release 1.5
Memory Usage Report

Station4 Program

14 March 1988 - 11:30

Station4 Program
Memory Usage Report

X = used address . = unused address									
NO:0	0	1	2	3	4	5	6	7	8
NO:20	X	X	X	.	.	.	.	.	9

[illegible]

[illegible]

REPORT OPTIONS SUMMARY

Page Width:	132
Page Length:	66
Graphics Capabilities:	NO
Context:	1
Starting Address:	#N0
Ending Address:	#N2

Allen-Bradley Co.
6200 Series Software
PLC-3 Programming Terminal Software
Release 1.5
Report Generation Procedures Report
Station4 Program

14 March 1988 - 12:43

Station4 Program
Report Generation Procedures

@SAMP 1	00000	E5.01.1.00000
---------	-------	---------------

```

;PROCEDURE SAMP_1
; THIS PROCEDURE PROVIDES AN INTRODUCTION TO PROGRAMMING IN GA BASIC
;
; CLEAR SCREEN
;
;FRAME
pr^p1;t^p24;2A      PROGRAMMING IN (GA) BASIC ^POT\X'
pr^p27;p56;p29;3AlIIIIIlllIIIIIIIIIIIIIIIIIIII104G'
pr^p3;4A^p2T(GA) BASIC^POT IS A PROGRAMMING LANGUAGE THAT THE 1775-GA MODULE USE
TO:\X'
pr^p10;f6A- PRINT OR DISPLAY FORMATTED REPORTS\X'
pr^p10;7A- MANIPULATE DATA IN PLC-3 MEMORY\X'
pr^p10;8A- INTERFACE WITH 1770-M11 MASS STORAGE SYSTEM\X'
pr^p10;f9A- OPERATE (LIST) FUNCTION OF PLC-3\X'
pr^p10;10A- INITIATE <MSG> AND <BLOCK TRANSFER> COMMANDS\X'
pr^p10;12ATHE FOLLOWING PROGRAMMING EXAMPLE WILL DEMONSTRATE A SIMPLIFIED OPERATO
\X'
pr^p10;13AINTERFACE PROCEDURE (GA) COMMAND LINES GROUPED TOGETHER FORM A PROCEDU
E)\X'
pr^p10;14THE RUNNING PROCEDURE WILL BE DISPLAYED INSIDE THE WINDOW ON THE UPPER
'
pr^p10;15AHALF OF THE SCREEN WHILE THE PROCEDURE COMMAND LINES ARE HIGHLIGHTED BE
OW\X'
pr^p10;16AS THEY ARE EXECUTED. FOR SPACE REASONS THE SIMPLIFIED PROCEDURE LISTI
G\X'
pr^p10;17ADDOES NOT CONTAIN THE ERROR CHECKING ROUTINES AND INDUSTRIAL TERMINAL \X
pr^p10;18ADISPLAY CONTROL CODES USED IN THIS EXAMPLE.\X'
@ANYKEE$O
IF(KEY.EQ.77)GO SKIP
@SAMP_2
SKIP:
XXIT

```

@SAMP_2 00001 ES.01.1.00001

! THIS PROCEDURE GIVES THE USER A WORKING EXAMPLE OF A GA BASIC PROGRAM
! WITH THE ACTUAL PROGRAM LINES DISPLAYED BELOW THE DISPLAY

```
P^L^P4C' ;CLEAR SCREEN
@SAMP_3 ;DRAW WINDOW
P^P0;10A'
@SAMP_4,'^P10;10A' ;PRINT SIMPLIFIED PROCEDURE
P^P1T^P0;10ASIMPLIFIED PROCEDURE LISTINGX,
P' (CONTROL CODES AND ERROR CHECKING OMITTED) ^POT^J^14,
FOR (X=1,5,1)
P^P2T^P5;'(10+X)'A'X
```

```
NEXT
P^P2T^P5;11A1 PRINT '\^L\^X'
P^P5;12A2 @WINDOW^X'
P^P5;13A3 PRINT '\^P2;4T SAMPLE PROCEDURE \^X'
P^P5;14A4 PRINT TIME() DATE()\^X'
P^P5;15A5 INPUT NAME'S \PLEASE ENTER YOUR NAME: ?\^X'
P^P2T^P11;11A1T()^P5B;1A'DA()
P^P2B;1A^P2;4T SAMPLE PROCEDURE ^P2T'
@SAMP_5
P^P5;16A6 PRINT '\HELLO \^ NAME'S \^!\^X'
P^P2;3AHELLO ^P2T'NAME'S' !
P^P5;17A7 INPUT A \PLEASE ENTER AN INTEGER
@SAMP_6 (0,99999) \^X'
A = INPUT
```

```
P^P5;18A8 PRINT '\VALUE #1: \^A\X'
P^P50;5AVALUE #1\14: 'A
P^P5;19A7 INPUT B \PLEASE ENTER AN INTEGER
@SAMP_6 (0,99999) \^X'
B = INPUT
```

```
P^P4;20A10 PRINT '\VALUE #2: \^B\X'
P^P50;6AVALUE #2: 'B
P^P4;21A11 PRINT '\THANK YOU!'
P^P4;22A12 PRINT '\^P3T THE SUM OF \^A\ + \^B\ = \^(A+B)\^X'
P^P2;5ATHANK YOU: \^X'
P^P2;5T^P2;7ATHE SUM OF 'A' + 'B' = '(A+B)'\^POT\X'
@ANYKEY^23
EXIT
```

```
@SPA_1      00002      E5.01.1.00002

;SPA_1
;SPA DEMO
;
;^L'
;FRAME
;^P2;11^P23;2A STATISTICAL PROCESS ANALYSIS \X'
;^P56^P2T^P29;3AIIIIIIIIIIIIIIIIIIII^POT^P46\X'
;^P2T^P65;1AALLEN-BRADLEY,
;^P65;2A1775-Y02T,
;^P65;3ASER-A/REV-A'
;^P65;4A@1985'
;^POT'
;^P3;6AALLEN-BRADLEY'S PLC-3 FAMILY STATISTICAL PROCESS ANALYSIS (SPA) SOFTWARE
,
;^P3;7APACKAGE PROVIDES YOU WITH A QUALITY CONTROL TOOL TO RECORD, ANALYZE AND'
;^P3;8ADISPLAY DATA OF AN INDUSTRIAL PROCESS.'
;^P3;10ATHE PLC-3 PROGRAMMABLE CONTROLLER COLLECTS PROCESS DATA ON A SELECTABLE
;^P3;11ATIME INTERVAL AND STORES THIS INFORMATION INTO DATA TABLE FILES.'
;^P3;12ATHESE DATA FILES ARE ACCESSED BY THE (SPA) SOFTWARE PACKAGE RUNNING IN
HE'
;^P3;13A1775-6A MODULE. THE (SPA) PACKAGE COMPUTES AVERAGES, MEDIAN, CONTROL '
;^P3;14ALIMITS, RANGES, STANDARD DEVIATIONS AND FREQUENCIES.RAW DATA CAN BE PRI
TED'
;^P3;15AOUT OR STORED ON A 1770-M11 MASS STORAGE SYSTEM. STATISTICAL DATA CAN B
,
;^P3;16ADISPLAYED IN CONTROL CHART FORM (HISTOGRAM, X-BAR, RANGE OR MEDIAN) ON
HE'
;^P3;17AIN INDUSTRIAL TERMINAL OR ANY RS-232-C PRINTER. . . . .'
;ANYKEYE20
IF (KEY.EQ.77)GO SKIP
@SPA_2
SKIP:
EXIT
```

REPORT OPTIONS SUMMARY

Page Width: 132
Page Length: 66
Graphics Capabilities: NO
Context: 1
Sort Order: SYMBOL
Starting Procedure: @A
Ending Procedure: @ZZZZZZZ

\XX IS USED TO REPRESENT NONPRINTABLE CHARACTERS FOUND IN PROCEDURES.

Allen-Bradley Co.
6200 Series Software
PLC-3 Programming Terminal Software
Release 1.5
Data Highway Procedures Report

Station4 Program

14 March 1988 - 10:34

Station4 Program
 Data Highway Procedures

```
@REM_ON      00000    E5.01.4.00000

;Procedure @REM_ON
;From 1775-KA User's Manual
;This procedure will monitor the state of a bit in a remote
;station and, when that bit goes true, turn on a bit
;locally for either 300 seconds or until the remote bit
;goes false.
;
;
ON ERROR @LOG_ERROR\09\09;log errors and time of day
A == 0\09\09\09          ;initialize error pointer
CREATE @TIM_START $B0:0  ;timer start word
CREATE @TIM_CTL $TCTL:1  ;timer control word
CREATE @TIM_PRE $TPRE:1  ;timer preset word
T_ON_BIT = 0             ;timer on bit
T_DONE_BIT = 017         ;timer done bit
CREATE @PROCESS $N3:7    ;process word
P_ON_BIT = 5             ;process on bit
ON = 1
OFF = 0
LOOP1:
  $B0:0/1 = $H023$B5:3/2 ;check remote bit in loop
  ;fetch and save remote bit
  IF ($B0:0/1 .EQ. OFF) GOTO LOOP1
  @TIM_PRE = 300          ;set timer for 300 seconds
  @TIM_START/T_ON_BIT = ON\09 ;turn timer on
  @PROCESS/P_ON_BIT = ON\09 ;turn process on
  LOOP2:
    $B0:0/1 = $H023$B:3/2 ;check timer and remote bit in loop
    IF (($B0:0/1 .EQ. ON) .AND. (@TIM_CTL/T_DONE_BIT .EQ. OFF)) GOTO LOOP2
    ;fetch and save remote bit
    ;turn process off
```

REPORT OPTIONS SUMMARY

Page Width:	132
Page Length:	66
Graphics Capabilities:	NO
Context:	1
Sort Order:	SYMBOL
Starting Procedure:	@A
Ending Procedure:	@ZZZZZZZ

\XX IS USED TO REPRESENT NONPRINTABLE CHARACTERS FOUND IN PROCEDURES.

Index

A

Address, extended 4-3, 6-36, 11-3
Addressing 6-35 to 6-38, 11-1
Addressing, data table 6-35
Addressing, file 6-36
Addressing, timer & counter bit 6-36
Auto Document 22-3

B

Baud rate 3-8, 3-11, 3-12
Bit instructions A-1
Branch editing 6-28

C

Cable connections D-1
Cable pinouts C-1
Cautions 1-1
Change mode 4-3
Change name 4-3
Change radix 11-2
Compare 14-17
Configuration, program upload/download D-2
Configure the printer 16-15
Control instructions A-14
Copying files 2-22
Cross Reference 15-10
Cursor keys 2-3, 14-2

D

Database 15-1, 16-8, 16-9, 15-4
Database Editor 15-4
Data Highway --
 And report generation messages 13-1
 Available reports 16-1
 Procedures 16-10
Data Highway Plus --
 In contact history display 12-14
 Online configuration 3-1
 Status line messages 6-39
Data monitor 11-1
Data table --
 Addressing 6-35, -36, -40
 General utilities 12-1
 In contact history 12-14
 Monitor 11-1
 Processor 11-1
 Reports 16-6 to 16-9
 To save 14-10

D *continued*

- Delete Context 18-1
- Deleting files 2-22
- Directory --
 - Change name 4-3
 - Display 4-5
 - DOS directory G-1
 - Program i-2
 - Report options 16-3
 - Save to file 14-3
 - View directory display (F7) 4-2
- Disk file 14-1
- Display processor data table 11-1
- DOS 1-2, 2-1, 16-1
- DOS directory G-1

E

- Edit Buffer 22-2
- Edit Changes, 2.0, 22-1
- Edit ladder rungs 6-9
- Error messages B-1
- Exporting files 17-1

F

- File name 14-2
- File/search instructions A-7
- File structures G-1
- Force, remove 10-4
- Force, table 14-12
- Forcing 8-1, 10-1
- Forcing I/O bits 10-3

G

- General options (in report generation) 16-11
- Generating the report 16-12, 24-1

I

- I/O message instructions A-3
- I/O status 12-13
- IBM XT information 20-3
- Importing files 17-1
- Instruction, rung & address searches 9-1

K

- KL board switch settings 3-5
- KT board switch settings 3-2
- KTK1 board switch settings 3-6
- KTP board switch settings 3-8

L

- Ladder display, configure 7-1
- Ladder editor 6-1
- LIST functions 4-4, E-1
- Logical memory 14-1

M

- Main address instruction F-1
- Math/logical instructions A-9
- Memory --
 - Available reports 16-1
 - Compare 14-16
 - Compare to file 14-17
 - Data Hwy Plus communication 3-1
 - Data table addressing 6-35**
 - Editing a message 13-3
 - Extended addressing 6-36
 - File options 2-21
 - Force table [F8] 14-12
 - Memory map 12-2, 16-6
 - Memory usage 16-9
 - Messages [F5] 14-12
 - Restore 14-14
 - Save 14-3
 - Save logical 14-7
 - Save, restore, compare 14-1
 - 2nd menu 2-23
 - Select context 14-19
 - Single context 14-9
 - Specify address 11-3
- Menu --
 - Top/Main 2-2
 - 2nd 2-23
- Merging files 24-1
- Message --
 - APPEND 13-7
 - cancel 13-4
 - copying 13-7
 - delete 13-4
 - editing 13-3
 - Main 13-3
 - map 12-7
 - OVERWRT 13-7
 - undel 13-4
- Messages, error B-1
- Messages, report generation 13-1
- Move/compare instructions A-4
- Multidrop 3-2, 3-7, 3-9

N

- NONAME 2-24, 4-3

O

Offline --

- programming/documentation 2-5
- configuration 2-5
- files 1-1

Online --

- programming/documentation 2-4
- configuration 2-5

P

Physical memory 14-1

PLC-3 --

- Addressing 6-35, -36, 6-39
- Arithmetic status 12-11
- Branch editing 6-28
- Compare to file 14-17
- Copying a message 13-7
- Force table map 12-9
- LIST 4-4
- Manual objectives 1-1
- Memory map 12-2, 16-6
- Online configuration 3-1
- Order of data table sections 16-7
- Related Publications 1-2
- Restore 14-14
- Save 14-3
- Search Dbase 15-8
- Software functions 2-1
- Status line 6-3
- Symbols 15-6
- User program 14-11
- WHO active 2-9
- WHO listen 2-8

Print reports 16-13

Printer configuration 19-2

Processor status 12-10

Programming terminal 1-1, 2-1

Publications, related 1-2

R

Register instructions A-13

Renaming files 2-21

Report extensions 19-1

Report generation 24-1

Reports 2-23

Restore 14-1, 14-14

S

- Sample reports H-1
- Save 14-3
- Save/continue 19-1
- Save/restore 14-3
- SB-file name 14-1
- SB-tape name 14-1
- Smart Menu 25-1
- Software --
 - Bit mask 12-14
 - Buffers 15-4
 - Change name 4-3
 - Compare 14-16
 - Deleting data files 12-5
 - Edit messages 13-3
 - File names 14-2
 - Functions 2-1
 - In deleted instructions 6-21
 - Instruction, rung & address searches 9-1
 - LIST 4-4, E-1
 - Online configuration 3-1
 - Program documentation 15-1
 - Status line messages 6-39
- Special instructions (file bit compare) A-15
- Status fields 12-11
- Station Diagnostics 2-11
- Switch Settings D-1
- Symbols 15-4, 22-3
- System symbols 14-12

T

- T45 information 20-1
- Timer/counter instructions A-2
- Transfer 23-4

U

- Unused addresses 16-9

W

- WHO active 2-9
- WHO listen 2-8



ALLEN-BRADLEY
A ROCKWELL INTERNATIONAL COMPANY

Programmable Controller Division
747 Alpha Drive, Cleveland, OH 44143

Publication 6200-6.5.3 — February 1989

Supersedes Publication 6200-6.5.3 — March 1988,
6200-6.5.3-DU1 — August 1988, 6200-6.5.3-DU2 — September, 1988

PN 955105-36